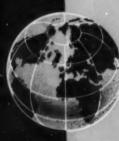
MINING WORLD



JUNE 1955, VOL. 17, NO. 7

Synthetic Scheelite From Salt Lake Tungsten

Almaden's New Mercury Furnacing Plant



New Ideas at Steep Rock Page 55



New additions! to our line!



Our new "24" Jeep mounted drill



The "44" truck

LONGYEAR INTRODUCES THE NEW "W" SERIES DRILL RODS

New Sizes Accepted as Standards by DCDMA and CDDA
The E. J. Longyear Company recently announced a complete line of drill rods developed to the new standards adopted by the Diamond Core Drill Manufacturers Association and the Canadian Diamond Drilling Association. Known as the "W" series, these rods will come in EW, AW. BW, and NW sizes. These new standards have now been recommended for worldwide acceptance.

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The Ed the Standards have now been recommended for worldwide acceptance.

	VPSET HA	LI DAKE MOD W	ITH COUPLING			
				4111	un	
Size of S	ed and Grapting	EW	84	BM	10x	
	O.D. of Rod & Chie.	1-3/10	1=1/4"	2-1/5"	2=5/8" :=5/1/:" 1=3/6"	
	I.D. of Hod	1-1/16"	1-7/16"	1-13/16"		
Specifi- cations	H Hole in Goupling	7/16*	5/84	3/4"		
	Threads per inch	3	3	3	3	
	Approx. #t. of 10'	25.0 160.	33.6 lbs.	43.1 100.	55.3 lbs	

cate several distinct advantages to be provided by the "W" series rods. The over-all increase in size makes for a more stabilized drill string with less vibration and a minimum of ground caving. The increased inner diameter of the rod provides a larger water passage through the drill string and reduces pressure loss. The increased outer diameter

A, B, and N drill rods and will

A, B, and N drill rods and will supply the necessary important substitutes.

The new "W" series rods in all sizes are now available for immediate delivery. Specifications of "W" drill rods and couolings can be obtained by writing to E. J. Longyear Company. Foshay Tower, Minneapolis 2, Minnesota, U.S.A.

We clipped this news story when the "W" series was announced

DATE June 3, 1955
Date second
PAGE HOW MEXICO
Le Manaphoole PLACE HOW MERSOD
for Ex.
unted drills have really put the

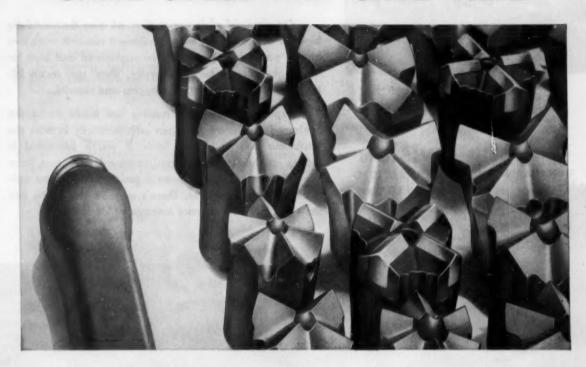
my the way, we've had a lot of comment Abu quasilums or mobile units. If you'll send us a supply of bulletins 2k-JG and kh-TO, we'll pass them out.

F. S. Right now, we're telling interested parties to write direct to Longrear in Himmeapolis.

E. J. Longyear Co. FOSHAY TOWER, MINNEAPOLIS 2, MINN

E. J. Longyear Co. MINNEAPOLIS, MINNESOTA

JUST CHANGE THE BIT—USE THE SAME STEEL AND SAVE TIME



TIMKEN[®] interchangeable rock bits let you switch bit types...easily, quickly...without switching drill steels

YOUR drillers will save valuably me with s, multiuse and carbide insert, fit the same steel, can be changed fast right on the job. Simply screw one type off, screw another right on the same steel.

This means new drilling economy—new savings in time, new boosts in production. Drillers can quickly switch to the most effective bit as the ground changes, instead of going after a different type of drill steel every time a different bit type is needed. What's more, because dozens of different Timken multi-use and carbide insert bits fit the same steel, you save on drill steel inventory.

Timken carbide insert and multi-use bits are both made from electric furnace Timken fine alloy steel. And both have the shoulder union, originated by the Timken Company, that keeps drilling impact from damaging threads.

Our rock bit engineers, backed by more than twenty years' drilling experience, can help you save money. No obligation, naturally. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



HOW TIMKEN MULTI-USE BITS SAVE YOU MONEY

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.



WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant gauge holes, small-diameter holes, very deep holes.

for the best bit...
for every job

TIMKEN



Bottom-Dump Coal Haulers have capacities of 25, 32 and 40 tens...engines from 190 to 300 h.p....dual or large single drive and trailer tires...torque converter and Torqmatic drive or standard transmission.

EUCLID DIVISION

GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

Higher Availability More Tonnage Lower Costs

On scores of mining operations all over the world the high job availability of Euclid equipment results in more tons hauled per shift. Because they're engineered and built for the toughest off-the-highway service, "Eucs" stay on the job longer, with less time out for servicing and repairs.

Dependable low cost hauling has made Euclid the preferred equipment for open pit operations in both the bituminous and anthracite fields. If you're interested in cutting your hauling cost for coal, overburden or waste, have your Euclid distributor prepare a production and cost estimate for your operation. There's a good chance he can show you how to haul more tonnage at lower cost.





Euclid Equipment

GENERAL MOTORS

FOR MOVING EARTH, ROCK, COAL AND ORE

Mining World

Including the Export Edition WORLD MINING

Published monthly except in April when publication is semi-monthly

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COVER PHOTO shows hydraulic monitor disintegrating lake-bottom overbur	

is then stripped from bedrock by suction dredges.

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WORLD MINING is published the 26th of each month as a regular department of MINING WORLD and is also circulated as a separate publication on a carefully controlled free basis to a selected list of management and supervisory personnel associated with active mining enterprises throughout the world.



MILLER FREEMAN PUBLICATIONS



GRAB SAMPLES From the Mail

Wants Metallurgical Articles

Dear Sir:

Dear Sir:

We would like to purchase one reprint
of each of two papers which appeared in
the Mining World, January 1954, entitled "Will Cyclones Replace Mechanical
Classifiers" and "New Uruwira Mill Discards 50% of Feed by HMS to Triple
Lead-Copper Flotation Head.

D. A. LIVINGSTON
Chief Metallurgist
Golden Manitou Mines Limited

Golden Manitou Mines Limited Val D'or, Quebec Canada

Uranium For Golden Anniversary

In 1954 this corporation, and its prede-cessors, celebrated its 50th year in busi-

In the December 1954 issue of MINING In the December 1954 issue of MINING WORLD on page 40 you publish a picture of the shaft at our uranium mine near Uravan, Colorado. If possible, we would like to reproduce this picture in our Golden Anniversary annual report and would appreciate it if you can furnish us with the film or a cut which would be suitable for this purposes.

with the film of a cut which would be suitable for this purpose. Norman E. La Mond Secretary and Treasurer Shattuck Denn Mining Corporation New York, New York

Uranium is a fitting addition to this company's long and successful base metal history. Hope the picture will add to the Golden Anniversary Report. Ed.

Brazilian Mining Law Changes

I very much enjoyed reading your arti-cle on "HOW AMERICAN MINING COMPANIES CAN NOW OPERATE IN BRAZIL" (WORLD MINING, February

Your readers may be interested in the following legislative changes made re-

cently:

cently:

a) Dividends on bearer shares are now subject to 25% tax withheld at source in addition to normal tax on business income. (Law 2.354-29/11/1954.)

b) The Federal income tax for companies is now calculated as follows (Law 2.354-29/11/1954):

Up to 500.000 cruzeiros-15%

Over 500.000 cruzeiros-15%

c) The minimum wage now varies

c) The minimum wage now varies according to locality (from 555 cruzeiros per month in the interior of the state of Rio Grande do Norte to 2.400 cruzeiros per month in the city of Rio de Janeiro.)

STEPHEN E. BASCH Machado da Costa S.A. Parana, Brazil

Where Rum Jungle Ships U,O.

Dear Sir

I should like to draw your attention to an error in the brief article "Rum Jungle Uranium Mill and White's Mine on page 50 of the January issue of "MINNING WONLD." The final sentence is to the effect that a uranium precipitate is stockpiled awaiting the start of the Port Pirie, Continued on page 84

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DOW XANTHATES—superior collectors for efficient, low-cost recovery of sulfide minerals. For example, with Z®-11 and proper pulp conditioners you can actually reduce collector consumption while increasing recovery. And you'll get away from those complex collector combinations, too.

DOWFROTH 250—builds livelier, easier handling froth with as little as one-quarter the consumption of frothers previously used. Along with this economy, Dowfroth® produces improved concentrate grade and metal recovery in mill after mill. Dowfroth 250 is a noncollector, too—it's easy to regulate!

MINING TECHNICAL SERVICE—maintained by Dow to promote flotation economy, this service is always available to help solve your flotation problems. Working in Dow's complete laboratories or traveling to mills around the world, Mining Technical Service has aided mill men throughout the mining industry with their flotation problems.

You, too, can gain the benefits of research and experience through Dow's Mining Technical Service. To request this service or to get samples of dependable Dow reagents, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 817J-1.

you can depend on DOW CHEMICALS



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announce the appointment of

STANCO

MFGS, and SALES INC.

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as exclusive Distributors in the 12 Western States

for the MANY

surface diamond drill

This light weight (205 lbs. net), compact, portable diamond drill is unrivalled for exploration work. Takes 3/4" core—1-3/16" hole to 200 ft. and 7/8" core 1-1/2" hole to 100 ft. Economical too... in first cost and day to day operation. Normal fuel consumption less than 3 gallons (U.S.) per 8 hour shift. See your dealer now.



DRILLS, ACCESSORIES, AND SPARE PARTS Available Through These Deglers...

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Cheyenne, Wyoming UTAH BIT & STEEL Midvale, Utah

S & M MACHINERY Grand Junction, Colorado PACIFIC MINE & MILLING CO. Fresno, Calif.

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Los Angeles, Calif.

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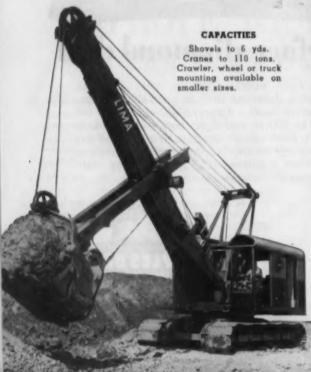
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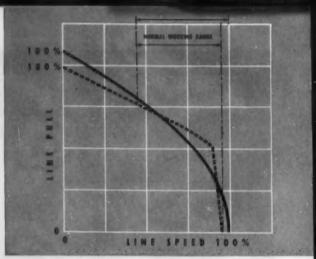
CAL.-ORE. MACHINERY CO. INC. Medford, Oregon MINE AND MILLING SUPPLY CO. Los Angeles, Calif.

LIMA'S new Electric Power Unit eliminates stalls, won't burn out

LIMA's new optional power unit matches, electrically, diesel-torque converter performance. It combines an AC motor with a single stage torque converter to adapt actual power output to work load demand—at constant motor speed. Thus, you get power on demand through a wide operating range . . . and the motor will not stall or burn out in heavy load operation.

Just check the performance curves — They make it clear that LIMA's new electric power unit is the perfect answer when your job calls for electrically powered machines. The new unit is available on every LIMA machine. It will pay you to get the full story today from your nearby LIMA distributor . . . or write: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio,



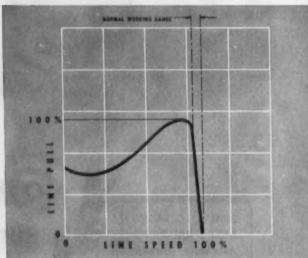


Power Performance of LIMA'S New Optional Unit:

A.C. Electric motor with torque converter drive [Diesel-torque converter curve (dotted line) shown for comparison]

With this drive, even under extreme loading, the motor will pull down in speed only a very small amount. It can never be stalled,

The line pull will constantly increase through a long pull down speed range, depending upon the load applied.



Power Performance: A.C. Electric motor with direct drive

The motor speed and torque varies as shown for line speed and pull. With a pull down in speed of only 3% to 5%, torque rises too fast. The motor will stall quickly after peak torque is reached. Workable speed range is small, stalls are frequent.



LIMA

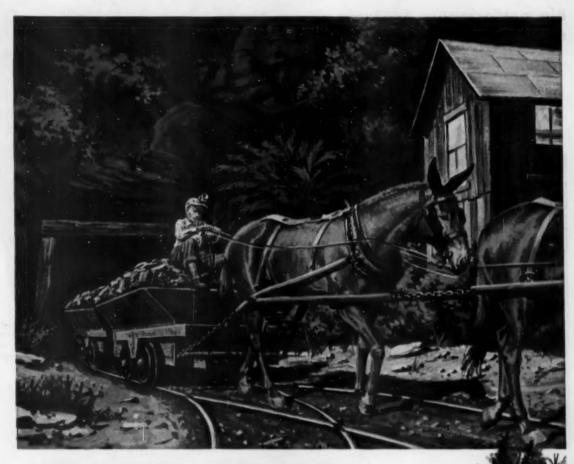
SHOVELS - CRANES
DRAGLINES - PULLSHOVELS

BALDWIN-LIMA-HAMILTON

Construction Equipment Division · LIMA · OHIO · U. S. A.

Cable Address: Limpshovel

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD



MUSCLES OF STEEL

put the mules out of business

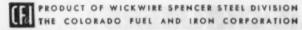
Oldtimers in coal mining can remember when mule-power was the only means of transportation in the mines.

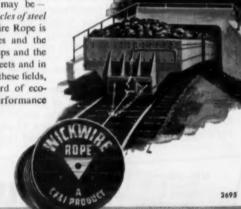
Today's efficient coal mining demands big-capacity mechanized equipment. In modern underground mines, wire rope serves as muscles of steel—pulling cars from the loader to discharge point. In strip mining, also, wire rope provides the muscle for huge stripping shovels.

No matter what the job may be—wherever there's need for muscles of steel—it's a safe bet that Wickwire Rope is busy at work. In the mines and the quarries. In the logging camps and the oil fields. With the fishing fleets and in materials handling. In all of these fields, Wickwire Rope has a record of economical and dependable performance that can't be beat.

every industry benefits from wire rope

WICKWIRE ROPE





THE COLURADO FUEL AND IRON COMPUBATION—Absless (Tex.) - Desver - Neuron - Béassa (Tex.) - Phoents - Solt Lake Cay - Tubes
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WICEWITE SPINCES STEEL DIVISION—Backes - Bellane - Chetteneege - Chicago - Delevit - Endostes (Pa.) - Reve Orients - New York - Philadelphi

Big performance features of Allis-Chalmers HD-5G

INCREASE TONNAGE FOR MINERS HD-5G removes mill tailings from a settled tailings pend. Material has been processed for vanadium and will new be processed for uranium. These tailings are wet, heavy and extremely abrasive.



Here are three big features of the HD-5G that provide longer life, easier servicing and greater output — resulting in more tons of material handled every shift.

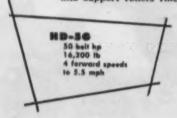
Designed for Front-Mounted Equipment — The HD-5G is designed specifically for front-mounted equipment — providing reduced front-end overhang and better over-all balance that means more work output at lower cost. In addition, important margins of safety in power and strength contribute to longer, more productive tractor life.

1,000-Hour Lubrication Intervals — Whether working in abrasive muck or penetrating dust, Allis-Chalmers HD-5G has the ability to stand up under these conditions. Truck wheels, idlers and support rollers ride on tapered roller bear-

ings with Positive Seals that keep dirt out . . . grease in. Seals are so efficient that bearings need lubrication only once every 1,000 hours — just twice a year based on a 40-hour week.

Versatility from Quick-Change Attachments—There's a variety of attachments—interchangeable with the 1¼-yard standard bucket — that makes the HD-5G a real producer at the mine, along haul roads or at processing plants — rock bucket, light materials bucket, lift fork, crane hook, trench hoe.

There are hosts of other big HD-5G advantages that will pay off on your mining operation. Let your Allis-Chalmers dealer give you the full story. You'll find it worth your while.



ALLIS-CHALMERS



Those jobs around the mill—construction work, setting machinery, loading and unloading of equipment and materials—there's the place for versatility and a machine that you know is always ready to go.

Your Northwest will handle any lifting problem and it is easily converted to a standard shovel or dragline without any major dismantling. As a crane it brings you the ability to handle the high, tricky jobs or it can lay a boom out flat and, of course, it can be equipped with all standard attachments from a clamshell or hook block to a magnet.

The "Feather-Touch" Clutch Control makes operation easy, without resorting to delicate mechanisms that often require special knowledge for adjustment. Uniform Pressure Swing Clutches eliminate

the jerks and grabs that cause dangerous boom whipping and swinging loads.

A wide range of Boom Hoist Equipment assures the right combination for any hoisting condition and makes possible a selection for one, two or three load lines with or without a live boom.

You should check into many other Northwest advantages. Northwest Traction, the Northwest Cushion Clutch, the Helical Gear Drive, Northwest Power Plants and other features—but, most of all check with Northwest Owners and you will find that Northwest is the machine you can always count on when you need it. Ask for a catalog on the capacity machine you need.

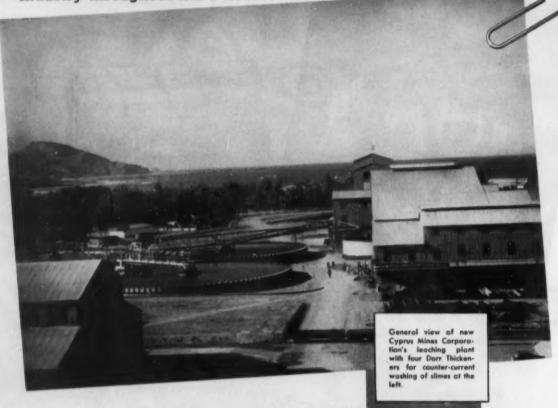
NORTHWEST ENGINEERING COMPANY
1511 Field Building • 135 South LaSalle Street • Chicago 3, Illinois

NORTHWEST

Convertible for any Mining Material Handling or Excavation Problem



How Dorr-Oliver Worldwide engineering serves the mining industry throughout the world...



<u>Copper from Pyritic Ore in Cyprus</u>

Cyprus Mines Corporation now recovers previously non-obtainable acid soluble copper by the addition of leaching to its existing flotation plant. Plant modifications involved separation of leached material into sand and slime portions and counter-current washing of both prior to flotation and iron cementation.

D-O Research at the Westport Mill found the project practical . . . D-O Consulting Engineering in the United States designed the complete plant. Dorr-Oliver, U. S. A., furnished the four

Dorr Thickeners and four Dorr Classifiers required in the revised flowsheet. D-O equipment installed in the initial flotation plant was supplied by our Associated Company, Dorr-Oliver, Ltd., London.

This is but one example of the flexibility of the Dorr-Oliver Worldwide engineering organization. D-O Worldwide experience can work for you too, through any of the following Associated Companies and Representatives, all with facilities for local manufacture.

In Surepet Dorr-Oliver Companies in England, Belgium, The Netherlands, France, Germany and Italy.

in South Africa: E. L. Bateman Limited, Johannesburg.

to todia: Dorr-Otiver (India) Limited, Bom-

in Australia: Hobert Duff Pty. Ltd., Mel-

in Japan: Sanki Engineering Co., Ltd., Tokyo.

in South America: Flore Company in Buenos Aires; Serva Ribeiro in Rio de Janeiro and Sao Paulo; John Lindsay in Caracas; and conveniently located Dorr-Oliver Resident Engineers.





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Pick any mining area in the country, and you'll find-in large mines and small mines-Edison Self-Service installations of miners' cap lamps delivering maximum economy and effi-

Edison Self-Service. The simplicity of the system, demonstrated in these many mines over the years, answers the need for effective, minimum cost lamproom procedure. Miners serve themselves . . . move in and out of the lamproom without waste motion. All-important too, is the quality construction and design of the Edison Lamp. This quality translates minimum lamproom care into maximum underground performance. Miners work better, and safer.

You can profit from our long experience in Self-Service. And remember, the Edison Lamp Rental Plan means you can have Edison dependability without a major initial investment. We'll be happy to fill in the details. Write or call.



When you have a safety problem, M-S-A is at your service ... our job is to help you

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At Your Service: 77 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.

Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, Sydney, N.S.

[World Mining Section-11]



Below ground you get best results with the WORDEN GRAVITY METER

Reduce mining exploration costs with the Worden Gravity Meter — world's smallest precision instrument for accurate gravity measurement. Manufactured exclusively by Houston Technical Laboratories, the lightweight Worden Meter (51/8 lbs.) accurately pin-points gravity anomalies. Indicating variations in mass, these anomalies help delineate mineral beds, greatly reducing the amount of diamond drilling and crosscutting necessary for exploration.

Requiring no external power source, the sealed, self compensating Worden Meter has the portability vital for fast, economical mining surveys. Reading accuracy of the Worden Meter is 0.01 milligal.



Worden Gravity Meters may be leased or purchased from HTL. Write for Bulletin GM-201.



HOUSTON TECHNICAL LABORATORIES

A SUBSIDIARY OF TEXAS INSTRUMENTS INCORPORATED

[World Mining Section-12]

MINING WORLD



Pures wherever it is needed

Rubber-tired tractor does a dozen jobs a day at Canadian cement plant

When one of Canada's largest cement manufacturers expanded one of their plants, their one crawler could no longer handle all the tractor jobs around the yard. Since some of these jobs were a half-mile apart, they either had to buy another crawler, or get a faster machine that could do the work of 2 crawlers. of 2 crawlers.

Replaces crawler

A similar problem had arisen before, and they used the same solution they had found satisfactory at another of their plants. They bought a 19 mph rubber-tired Tournatractor.

"Tournatractor goes anywhere fast," explains the general mill foreman. "It will work here a while, and then go over there. It runs wherever it is needed!"

Spots 100-ton rail cars

One of the Tournatractor's most frequent jobs is spotting railroad cars, some empty, some loaded with 100 tons of cement. It can easily push a dozen empty cars, the mill foreman says. He empty cars, the mill foreinan says. He doesn't know how many loaded cars it can handle, since it has never been necessary to move more than one at a time. "We have had cars off the track, though," he points out, "and Tournatractor pushes them back on without any trouble. One thing we especially like is the way it goes across tracks. A crawler will tear the blazes out of ties and rails, but those soft tires do not hurt them at all."

Maintains haul roads

Tournatractor's Angledozer blade is especially useful for grading the half-mile haul road from the pit. Trucks braking down the mountainside create a washboard effect in the road. Instead of riding up and down on these ridges as an ordinary dozer blade tends to do, Angledozer slices crosswise through them. Angle of cut, plus down-pressure, keeps blade from bouncing, quickly blades road smooth. Tournatractor then covers surface with gravel. Final step is to back-blade down the hill to smooth out the finished grade.

"On this work," mill foreman continues, "Tournatractor makes 3 or 4 trips up and down the road while a crawler would make only one."

Lowers repair costs

Despite its greater-than-crawler speeds, Despite its greater-than-crawler speeds, Tournatractor has needed practically no repairs. In the 90-day period before these pictures were taken, for instance, machine was stopped only 4 times — 3 times for cable changes (each requiring about an hour) and once to replace a small electrical part.

Another important advantage of Tour-natractor that the foreman mentioned natractor that the foreman mentioned was that its tires gave a lot more mile-age than did crawler tracks. "You put 35% of your wear on a crawler just in driving job-to-job," he says, "while traveling doesn't hurt Tournatractor tires at all."

Before you buy another set of tracks, it will pay you to investigate Tourna-tractor. Ask your LeTourneau-Westing-house Distributor for the proof of an on-your-job demonstration.

Some of the jobs this one Tournatractor does

- 1. Stockpiles coal
- Grades and gravels half-mile haul road
- Dozes 100 tons of gypsum per day into hammermill
- Spots railroad cars
- Backfills quarried-out spots in the
- Bulldozes the waste dump
- Handles all clean-up for shovel in old pit
- Cleans up for shovel in new pit when crawler is down for repairs or can't keep up with work
- Moves machinery
- Cleans up yard
- Stockpiles iron cinders, limestone, and gypsum
- Feeds iron cinders to clamshell in
- Pushes derailed cars back on track
- Plows snow from haul roads and plant area

Intermittently all day long, Teurnatractor dezes iron cinders to clamshell bucket on overhead crane, it also dozes in the limestone, shale, and gypsum...completes jobs in few minutes



One of Tournatemeter's service jobs is to arade and gravel mountain haut road, Half-mile uphill trip takes only about 5 minutes. Rubber tires do not tear up readway, can go anywhere. Machine frequently enters plant for service jobs. Crawlers cannot.



Tournatractor makes fast work of tearing dow a ramp. One of its most important jobs is to keep haul road and yard free of limestone chunks dropped by trucks. Rock, which fre-quently wedges in and damages dual truck tires, does not injure tractor's big single tires.



Stockpiling and feeding of gypsum to hammermill is another daily task for Tournatractor. These and the finer abrasives, like cinders, do far less harm to the rubber than they do tracks, says the plant's master mechanic.

LeTourneau-Westinghouse Company



A Subsidiary of Westinghouse Air Brake Company

Tournatractor — Trademark — Angledaser Trademark Reg. U.S. Per, Off, T-566-Q-b

"AROUND THE CLOCK" IN ROCK . . .

MINES ZINC IN CANADA

Three shift work, 7 days a week, is the schedule of this all-electric MARION 111-M. Its 4 cu. yd. dipper gets no rest, for big production is needed at this zinc mine in Canada. Another MARION 111-M on the same operation handles the tremendous waste yardage involved.

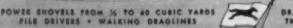
The strength, the power and the speed of the MARION 111-M, either as a diesel shovel with electric swing or as an all-electric machine, give this machine a bright future in mining.

Get the complete story on the MARION 111-M and what it can do in your open pits.



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[World Mining Section-14]

MINING WORLD



Above Rear-Dump handles 53% of limestone haul for Allegheny Mineral Corp.

The LeTourneau-Westinghouse machines you see here—a 186 hp Tournatracter and an 18-ton Rear-Dump—have been used by Allegheny Mineral Corporation, Cowansville, Pennsylvania, since the summer of 1953 both for stripping and for hauling shet limestene. Units work alternately at Alleghany's pits in Parker's Landing and Kithanning. They make trips between the two places under their own power. The Rear-Dump drives the 35 miles through traffic in about an hour; Tournatracter makes the trip in about two hours. Fingertip electric power steer and 4-wheel air brakes (more braking surface an 1 wheel than most units have on all 4) make for safe high-speed travel.



Above Rear-Dump is being loaded by a $1\,V_2$ -yd. shovel. Loads in the shot limestone usually weigh out at around 19 tons each. Note simplicity of the Rear-Dump body design. Unit has no frame, no sub-frame, no springs or spring hangers, no front steering wheels, no hydraulics — hence soldom needs repairs.



Low entry from rear, plus big 9½ x 12' target, speed loading, also reduce spillage. Triple-layered all-isteel body absorbs shocks of heavy, sharply-fragmented rack. High all-steel front guard protects driver, controls, Capacity of this Rear-Dump, without sideboards, is 18 tons. Other models carry 9, 35, and 50 tons.



Hauling shot limestone 4/10 mile from pit to crusher, Rear-Dump reaches 15 mph speeds, despite narraw roads, short sections of 10 to 15%, grades and several sharp curves. Tires give adequate traction even on snow and ice. Material being hauled will be crushed into agricultural limestone and road-surfacing.



Waste material is dumped about haif a mile from the shovel. Company records show Rear-Dump averages 34 loads per 8-hour shift—as much as the shovel can load. Note how body swings below and behind rear wheels. This keeps material from piling under unit, also allows safe dump over steep banks.



Spoil dumped by the LeTourneau-Westinghouse Rear-Dump and another hauler is leveled by Teurnatracter. Other duties for this 19 mph tractor include leveling and maintaining limestone aggregate stockpiles, pulling a 15-yd, scraper to self-load and strip dirt and rock, and pulling a ripper to loosen rocky material.



Tournatracter blade carries $2V_k$ cu, yds, per push. Electric-control down-pressure provides smooth sut. Tires rell without damage over abrasive footing which badly damages crawler tracks. Says Ce-Owner C. H. Snyder, "LeTourneau-Westinghouse units just fit our layout, Their maintenance is low and production high."

Tournairacier-Trademark 18-642-Q-6

For more information on either Rear-Dump or Tournatractor, please write or call:



LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company



Truco Diamond Bits and Reamer Shells are "ribbed" where it counts most. Each diamond, because of its natural structure, has a distortion which is known as the "rib" or hard vector and which is the hardest cutting edge on this best of cutting materials. In each Truco bit or shell, the diamonds are set in such a way as to turn this rib into the work. This enables the bit to cut faster and last longer, to give you maximum footage at minimum cost.

This hard vector setting, combined with Truco's "pattern" setting, which puts each diamond where it will do the most good, makes Truco bits and reamer shells the best bet for decreasing your drilling costs. • Why not find out more about them today? Write Joy Monufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

SPECIAL NOTE: Fast, expert Diamond Resetting Service by Joy helps to decrease your drilling costs! Joy service keeps diamonds at work as much of the time as possible... gives maximum salvage value... permits resetting in patterns suggested by extreme wear on returned bits.

Consult a Joy Engineer

INFORMATIVE BOOKLET D-38A

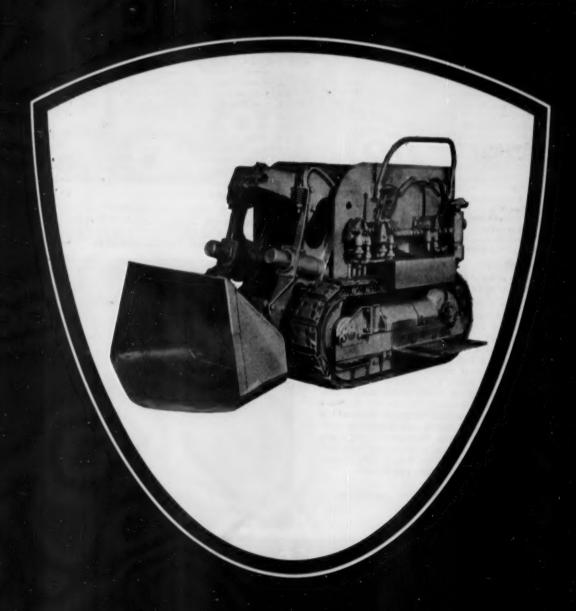
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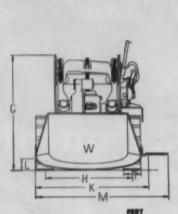
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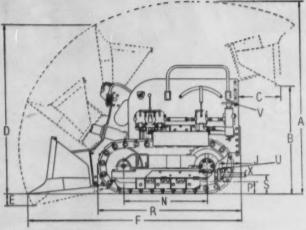


answer to "trackless" mining



SPECIFICATIONS





		Page 1	mm
A.	Head Room Std. Bucket		2390-288 2030-264
8.	Discharge Height Std. Bucket Discharge Height Nested Bucket		1320-188 1120-178
C.	Discharge Distance Std. Bucket Discharge Distance Nested Bucket		480-560 305
D.	Height at Minimum Length (Std. Bucket)	7'3"	2210
8.	Digging Dopth Below Grade	814"	215
P.	Overall Longth (Bucket) Bown — Std. Bucket)	9'4"	2845
G.	Minimum Height	4'11'4"	1510
H.	Track Gauge	45"	1145
J.	Distance from Drawbar to Rear of Machine	11%"	285
K.	Minimum Overall Width	4'1012"	1490
L	Oscillation at Center Line of Front Idler		150
M.	Overall Operating Width	5'8%"	1745

Eimco's 630 series, air or electric powered crawler loader is the answer to a need expressed by miner and contractor alike.

The 630 has many advantages in design for the leader user. Independent track control provides a pivoted turn by running one track forward and the other reverse. This feature makes it possible to attack the muck pile from any angle without backing to make a new run. Improved rocker-arm design provides better action and longer life. All wearing parts are easily replaceable in new patented design. All parts easily accessible. Tracks oscillate for uneven ground. Tracks are equipped with spring release to clear rocks or obstructions in the tracks. Heavy shafts and oversized antifriction bearings are used throughout. All parts are of heavy alloy-steel cast or fabricated construction for typical Eimco long-life heavy duty operation. Loading capacity 2-3 tons per minute.

Write for complete information.

		PERT	MM
M.	Length of Track on Ground	43%"	1115
P.	Ground Clearance	6"	150
R.	Minimum Longth	6'3\6"	1910
\$.	Height of Drawbar Above Ground.	9%"	245
T.	Track Shoe Width	9"	230
U.	Drawber Pin	11/2" dia.	38
V.	Air Inlet - Pipe Size	11/2" IPS	
W.	Bucket Capacity	51/2-11 cu. ft.	1/4-1/4 cu. M.
X.	Drawbar Tongue Opening	2"	50
	Weight Complete	9400 lbs.	4260 Kg.
	Area of Ground Contact	790 sq. in.	5,100 eq. cm.
	Speed	0-1.5 m.p.h.	0-2.4 Km/hr.
Y.	Motors (Eimeo Air or Electric)	3	3+
	Electric Motor Rating	Special	
	Air Motor Rating	12 HP @ 90 p	.a.L
	Drawbar Pull (lbs.) at Zero Track Slippage	10,600 lbs.	4,800 Kg.

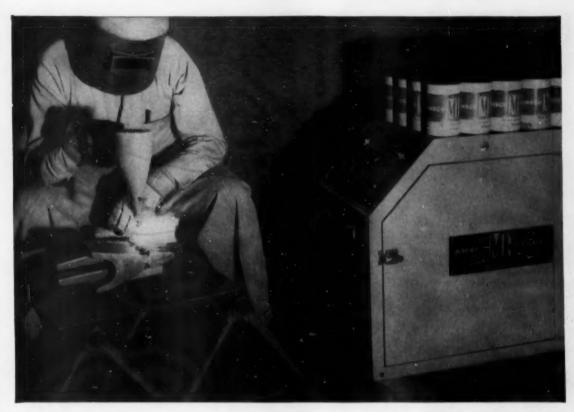




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Welder is shown welding a "wear-sharp" repointer to the shank of a dipper tooth using the Amsco MF and flux.

HARDFACE WITH THE AMSCO® MF

for manual flexibility . . . plus machine speed and accuracy

The Amsco MF combines the visibility and craftsmanship of hand welding with the automatic advantages of machine work. Speed of hardfacing increases because the Amsco MF uses small-diameter electrode and high-current densities which allow the operator to maintain a high deposit rate. The electrode feed is continuous—and automatically regulated—to maintain a constant arc. Thus, the machine automatically compensates for operator movement or an irregular welding surface.

Cost of deposited metal is less! The Amsco MF uses coiled, bare mild steel electrode. It feeds through the flux hopper (the cone). There it is magnetically coated with your choice of manganese steel build-up or hard-facing alloy which is carried in the flux. You coat your electrode as you weld at considerable savings in deposit cost.

The machine is portable. It plugs into any standard welding unit, and requires no special setup. See a demonstration of the Amsco MF's speed, quality of weld and uniform deposit. Try it yourself and discover how easy it is to operate. Your Amsco Distributor is ready to show it to you now. Welding products are distributed in Canada by Canadian Liquid Air Co., Ltd.

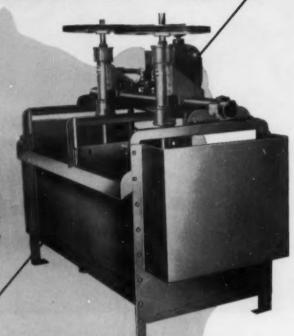
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Other

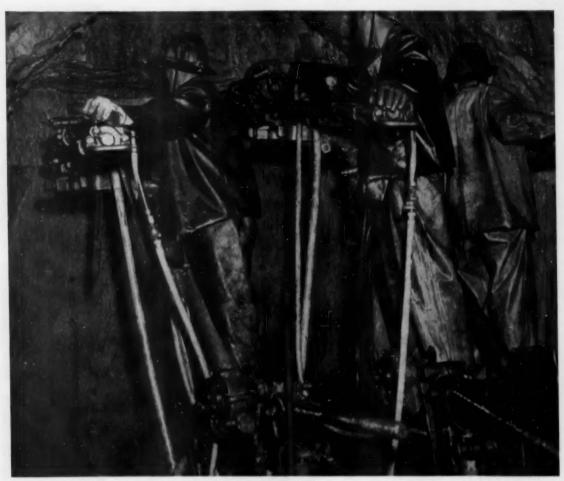
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Bethlehem Hollow rips into quartzite during tunnel job at Burke, Idaho. Steel supplied by Bitco, Inc., Wallace, Idaho.

They moved 33,000 cu yd of rock for 8500-ft tunnel in Idaho

The task was formidable—removing 33,000 cu yd of quartzite to make way for a new tunnel, 8500-ft long, at Burke, Idaho.

The tunnel, a 10 ft x 11 ft bore, is part of a lead-and-zinc mine owned by Hecla Mining Company. It was driven from the Hecla Plant to intersect Hecla's main Star Mine Shaft on the 2000-ft level. Reasons for the tunnel were many: (1) to improve ventilation (2) eliminate hoisting (3) eliminate pumping 100,000,000 gal of water yearly (4) reduce transportation time in reaching the working faces (5) carry a 13,200-volt cable

through to underground machinery, and (6) reduce operating costs.

Construction of the tunnel was handled by Sullivan Mining Company, a subsidiary of both the Hecla Mining Company and the Bunker Hill & Sullivan Mining and Contracting Company. Lee Messerly was the superintendent in charge.

Jumbo-mounted drifters put 8- to 10-ft holes in the medium-hard quartzite. The contractor reports that the large tonnage of Bethlehem Hollow Drill Steel which was used on the project—1½ in. round and fitted with longwearing carbide-insert bits—turned in an outstanding performance.

Leading distributors and converters throughout the West handle Bethlehem Hollow Drill Steel.

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BETHLEHEM PACIFIC



Imagine a Lectromett furnace with these dimensions! Small enough for laboratory experiments Large enough for pilot plant operations Battella is putting these two Lectromett Fernaces to wark for industry in a new building designed specifically for large-scale research studies.

Imaginations were allowed free rein at Battelle Memorial Institute, Columbus, Ohio, and this Lectromelt* Furnace Equipment is the result. Any type of furnace shell can be employed, including a 7-foot, open-top stationary smelting shell, a traveling, rectangular hearth for progressive smelting, or a steel-melting type of 1-ton capacity with 90° nose tilt. All can be operated with or without a roof.

Electrodes can range from four to eight inches in diameter, and can be placed in any configuration—triangular or in-line. 144 possible voltage connections, from 23 to 554 volts, are provided by the oversize furnace transformer.

Battelle is counting on you to put this furnace to work

The scope of metal refining and recovery projects will be widened considerably by the addition of this second Lectromelt Furnace. Two-slag smelting research on methods of recovering metals now wasted is an important possibility. Cheaper scrap for melting...how to handle hot metal charges...special reduction and melting processes...more economical use of the high temperatures developed in electric furnaces—these are typical problems warranting study.

Added knowledge on the physical chemistry of slags will broaden the field of application of electrothermics. Procedures in ferro-alloy production can be analyzed more accurately because of the exact gradations in voltage provided. A cut in calcium carbide costs may result from a search for a method of using a poorer grade of raw materials and a recirculation of calcium oxide sludge.

For a free copy of Lectromelt's Catalog No. 105, write Pittsburgh Lectromelt Furnace Corporation, 324 32nd St., Pittsburgh 30, Pa.

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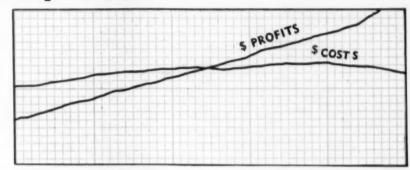


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Send us a small sample by parcel post (10 to 15 pounds is usually sufficient). We will make a preliminary examination at no charge and give you a report on these preliminary findings. These reports supply facts for your future plans. DECO recommendations are accurate, unbiased and thorough. They are based on sound engineering and economic principles and will greatly accelerate the success of your project.

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DECO Engineers will help you work out the flowsheet which will give you an operation that is simple, efficient and most profitable. Many typical flowsheets are at your disposal and may apply to your specific problem.

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Your plant can best be designed by men who have been in that business for many years. After our many years of mill design and operation we have available for your use, typical mill designs and mill construction and operating costs. Machine templates will aid you in your layout work. Please write to us about your contemplated plans.

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[World Mining Section-23]



Flotation is a versatile process. But its effectiveness is usually determined by the ingenuity of its application and the reagent combination used.

There isn't—and there probably never will be—a "miracle drug" to solve all ore treatment problems. Keystone of Cyanamid Service to Metallurgy is a long line of versatile Cyanamid Reagents and the practical help of Cyanamid Field Engineers in their effective application. For instance:

AEROFROTH® FROTHERS. We provide a range of frothers with and without promoting properties to produce froths having varying degrees of selectivity, persistence and texture. Alone or in combination, these Cyanamid reagents can produce a froth exactly suited to the ore, flow scheme and mill operating condition.

PROMOTERS. Literally, we make dozens of promoters... by far the greatest variety available. From this comprehensive group, Cyanamid Field Engineers can help you select a promoter or promoter combination for almost any job. AERO* Xanthates, AEROFLOAT ® Promoters and 400 Series AERO* Promoters, AERO* Thiocarbanilide 130 for metallic

ores; cationic Aeromine © 2026 Promoter,700 Series fatty acid and 800 Series sulfonate promoters for flotation of non-metallics.

AERO* DEPRESSANTS. Versatile and highly-useful reagents in depressing talc, carbonaceous and other gangues and gangue slimes, they often add much to the effectiveness of a Cyanamid Reagent combination.

AEROFLOC® REAGENTS. Latest addition to our family, these flocculating agents accelerate thicken ing rates, improve filtration and conserve values previously lost to overflow. Several AEROFLOC Reagents are available to suit various conditions.

OTHER REAGENTS. We also supply such widely-used chemicals as Aero ® Brand Cyanide, sodium cyanide, soda ash, copper sulfate, sodium silicate, alkali polyphosphates, zinc sulfate, oleic acid and others. We can simplify your inventory by delivering exactly what you need in the quantity you require. Smaller mills benefit by lower freight costs on combination shipments, too.

Whatever your flotation problem Cyanamid Field Engineers can help you get lowest cost-plus-tails with the right combination of Cyanamid Reagents.

Copper concentrates produced from chalcocite with AEROFLOAT ® Promoter average 22% from a feed averaging under 1% Cu. Copper concentrates contain 0.2 to 0.3 MoS₂, from which an 85-90% MoS₂ final product is made by this unique procedure: COPPER-MOLY Depress Cu with Cyanamid sodium ferrocyanide and sulfuric acid in a series of Mo flotation steps to produce a 50-70% MoS₂ product Regrind. Refloat moly in presence of sodium cyanide to make 85-90% MoS₂ concentrate. (U.S. Patent 2,664,199). At Cyanamid's Florida operations, phosphate rock and quartz are floated with crude tall oil (AERO* Promoter 708). Rougher con-PHOSPHATE centrates are washed with sulfuric acid to remove adhering fatty acid. Quartz is then floated off with Arromine ® 2026 Promoter and kerosene. Final product runs only three to four percent insol and well over 70% bone phosphate of lime. Arromine ® 2026 ROCK Promoter is a recent product of extensive Cyanamid research. Froth flotation now converts dune sand into valuable, custombuilt products. Raw sands, comprising equal parts of quartz and high-alumina minerals, average 0.12 to 0.15% Fe₂O₃ and 11.5% Al₂O₃. Scrubbed in attrition machines, these sands are then deslimed, conditioned LOW-IRON and iron-bearing minerals floated, leaving behind 95% of the feed in a finished product that assays 0.06% Fe₂O₂ and 10.7% Al₂O₃. Flotation reagents used include sulfuric acid to adjust pH during GLASS SAND conditioning to 2.5, pine oil, fuel oil, and Cyanamid Arno* Pro-Subsequent flotation in another section produces a high-grade feldspar concentrate and a practically-pure quartz tailing. Tailormade blended quartz-feldspar products are also produced. Apatite-ilmenite ore in an amphibole-pyroxene-allicate and clay gangue is crushed, ground and run through Humphreys spirals. Middlings and concentrates are completely deslimed, conditioned at 70% solids with AERO* Promoter 710 and a bulk apatite-II MENITE ilmenite concentrate is floated off. Bulk concentrate is dewatered and conditioned for apatite flotation at 70% solids and 90° F with caustic starch and AERO* Promoter 708. Separation of apatite from ilmenite is 99.97% complete.

AMERICAN Gyanamid COMPANY



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Every Traylor Grinding Mill is individually engineered and built to exacting specifications developed from data furnished by the customer. In addition, every Traylor mill includes many proved features which combine to assure you more efficient, economical production . . . a more uniform end-product . . . of the proper size.

Traylor mills feature steel gears . . . precision cut with high and low addendum on our MAAG gear generator. Main bearings are fitted with a high pressure pump. This pump coats each trunnion with a film of grease which lifts and floats the mill to overcome high starting torques and eliminates undue wear caused by "dry" starting after a shut down. Traylor mills are built in all sizes up to and including 1500 H.P.

For additional information on Traylor Grinding Mills send for illustrated Bulletin #6121.

TRAYLOR ENGINEERING & MFG. CO. 753 Mill St., Allentown, Pa.

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The GISMO offers you an entirely NEW concept of simplicity and economy in mining...

THE GISMO offers you a new method of mining. One that over a period of $2\frac{1}{2}$ years of intensive development in actual work has proved beyond question advantages that merit its thorough investigation by any firm excavating rock or its equivalent.

The Gismo offers you a general purpose utility self-loading transport that is simple, versatile and built to take the brutal punishment of rock excavation—and at important savings! It is well suited to almost all mining conditions. No special development facilities or conditions are usually required. It operates in sloping ore bodies

with irregular outlines, as well as large or relatively small openings. The Gismo is easily maneuverable at maximum or minimum speed of the equipment.

With perhaps a few exceptions, the Gismo can be taken into any mine. Its cross sectional dimensions are small compared with other equipment. It can be dis-assembled for lowering through small shafts.

Its versatility meets every requirement, It loads (mucks) in development or production . . . transports . . . drills (supports 2 to 5 jib mounted drills) . . . back fills . . . moves boulder rocks . . . makes its own roadways and cleans up completely.

The Gismo is an efficient machine that can load and transport up to 100 tons per hour with a 300 ft. haul...drill at rate of 400 ft. per man shift... is an extremely simple piece of equipment built for rough work and requiring little maintenance. Its initial cost can be reasonably compared with one year's maintenance cost alone of much of the conventional equipment in present use. It makes possible a mining method requiring few machines, few men, less plan-

These two photos show extreme positions the S-D Gisme shovel mechanism takes while loading. Upper photo shows shovel ready to begin loading stroke and photo at right shows position of shovel at end of stroke, loading material back into body.

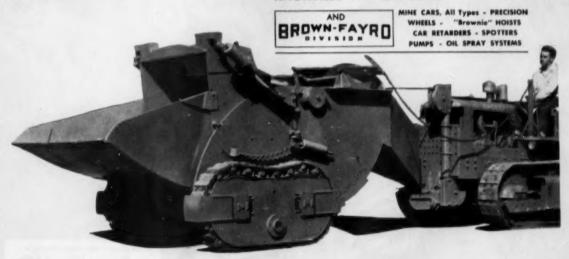


ning and integration. It allows total mechanization of your mine—the solution to present economic conditions of high manhour and materials cost, and low metal prices. Contact us for complete information. Sanford-Day Iron Works, Inc., P. O. Box 1511...Telephone 3-4191, Knoxville, Tennessee.

The Gismo does not load by momentum or crash fashion! As it approaches the feat of muck pile, shovel head is eased into pile as simply as a hand shovel into sand. Material is actually shovelled under complete control of operator and within his complete vision. Photo at bottom of page shows Gismo with tractor, operated by only one man.

Sanford-Day WORKS

KNOXVILLE . TENNESSEE





Anaconda introduces a NEW SHUTTLE CAR CABLE







New neeprene insulation compound gives Securityflex cable physical toughness on the INSIDE as well as the outside.

New stranding of grounding conductor prevents broken wires — assures continuity of ground, fewer failures, fewer splices, less production loss.

New nylon Anti-Short Breaker Strip* helps give Securityflex amazing crush resistance. This construction minimizes short circuits between conductors even under heaviest impact.

New insulation, new stranding, new breaker strip, and jacket reinforcement mean longer, safer, more economical service than ever before from twin parallel cable.

"Heart trouble" causes most mine cable failure today. The jacket may look fine. But inside . . . in the heart of the cable . . . the story may be different. Insulation damaged — even punctured — or conductors broken.

Based on painstaking failure studies of all makes of cable, Anaconda has further improved its Securityflex^b Shuttle Car Cable.

- Rugged high-grade neoprene insulating compound greatly increases resistance to puncture, flame and crushing a contributory cause of failure in mine cables.
- 2 Improved stranding of grounding and power conductors prevents broken wires—assures continuity of ground for the life of the cable.
- 3 Unlike other types of shuttle car cable, ANACONDA Securityflex with patented nylon breaker strip increases short circuit protec-

tion — more so than ever before. Nylon reinforcement in jacket also adds to cable strength and prevents wicking of moisture.

Actual mine tests show that this new construction greatly increases cable life because of fewer failures, therefore less down time. Improved Securityflex is another achievement of Anaconda mine cable engineers in the never-ending search for better, more reliable cable for mine use.

Ask the man from Anaconda for full information on new Securityflex Shuttle Car Cable. See your Anaconda distributor or write: Anaconda Wire & Cable, 25 Broadway, New York 4, N. Y.

ANACONDA





The Man Who Swallowed a Fortune

"Here," shouted Seigneur de Sancy to his bodyguard. "Here are the marks of the melée. Find my poor Pierre and there, I know, you will find the diamond."

When they found the grave in the forest, they found, too, that the brave old retainer, carrying the great jewel to King Henry IV of France (so that he could pawn it to finance his armies) had foiled the robbers at the cost of his life. When his stomach was slit open, there lay the Sancy diamond.

For lending his diamond to France, Henry made de Sancy ambassador to the court of Queen Elizabeth of England, who liked the jewel so much that she bought it. It passed to Charles I, who lost his head on the block, and, later, to James II, who fled to France after a disastrous defeat and sold the Sancy to Louis XIV for \$125,000—a fancy price in those days for a diamond of 53½ carats.

During the Revolution, it was stolen with the Crown Jewels of France, found weeks later in a gutter in the Champs Elysées, quickly stolen again, re-discovered in 1828 when it was sold to Prince Demidoff of Russia for \$100,000. Today, it is said to be back in India, where it was originally found, probably a thousand years ago.

First cousins to these great diamonds of history are the fine industrial diamonds we import for the manufacture of Truco Diamond Bits. At the drill rig, Trucos provide that irresistible cutting power which takes them through any formation, swiftly, accurately, thriftily, dependably. They save rig time and they lower footage costs. Do you need a new Truco Diamond Bit Catalog?

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- · Low power consumption
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Please rush further details about the new Dings Universal Series Metal Detector.

Company.

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JUNE 1955

33

MD155

"Secret" of lower belt costs is concave sides





Plants that keep track of costs on drives know this: they get longer wear at lower cost per year of service when they specify Gates Vulco Ropes—the V-Belts with concave sides.



Here's WHY concave sides keep belt costs down:

When the Gates belt is bent around the sheave, the precisely engineered concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley.

This full, uniform contact assures even distribution of wear. Naturally, even wear means longer wear. And longer wear cuts belt replace-

ment costs...reduces down time...contributes to profits.



Prove to yourself the value of concave sides



Bend a straight-sided belt (Fig. 2) and feel the sides bulge out around the bend. You see immediately that the bulging sides prevent an even fit in the

pulley groove (Fig. 2-A). Uneven contact causes faster wear...increases belt replacement costs.

Reduce costs and down time for belt replacements—specify Gates Vulco Rope Drives—the V-Belt with concave sides (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—World's Largest Maker of V-Belts.

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TPA 46-8

GATES" DRIVES

The Engineer's Report

CASE HISTORY

PRODUCT

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Bagdad Copper Corp., FIRM Bagdad, Arizona

Biggest truck in the world uses RPM DELO Oil!



246,000 POUNDS TOTAL LOAD, 48 tons of truck and 75 tons load, are hauled out of the Bagdad Copper Corp.'s ore pit at Bagdad, Arizona, by the two 350 h.p. supercharged diesels in this unit. RPM DELO Special Lubricating Oil is used in the engines as specified by Mr. Ernest Dickie, General Manager of Bagdad, on the basis of his years of experience with RPM DELO Oils in many other heavy—duty engines.

The big truck, described as the largest in the world, was designed by Mr. Dickie and engineers of Dart Truck Co., builders. Power is transmitted through 3-stage torque converters. All controls are powered.

FREE FOLDER tells you about all the RPM DELO Oils and how they meet every heavy-duty engine condition. Write or call

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How RPM DELO Oils reduce wear, corrosion, oxidation in all heavy-duty engines



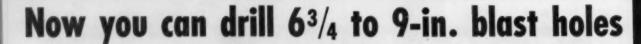
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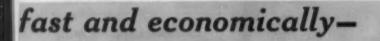
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40-R ROTARY The new 40-R is another significant Bucyrus-Erie advance in rotary blast hole drills. Flexible and powerful, it puts down medium-large holes quickly and efficiently in both hard and soft formations.

Continuous progress in any material is assured by this exclusive combination of features: variable drilling speed through Ward Leonard electric control and variable down pressure through hydraulic motor control.

The Ward Leonard variable-voltage system gives the operator smooth, instant command over rotation of the drill pipe. He can choose the most efficient speed for a given formation — can vary the speed as required without stopping the drilling operation. In hard formations maximum down pressure may be exerted on the bit while the drill pipe is turning slowly. In soft material, rotating speed can be increased substantially as down pressure is automatically reduced.

There are many other features that contribute to low operating costs and long machine life. Write today for full details and specifications on the 40-R, available with either diesel-electric or full electric power.

BUCYRUS-ERIE COMPANY



Drifts and Crosscuts

We've Been Asked

We've been asked about our yearbook cover. Readers are curious about the art work appearing in the lower right hand corner. The MINING WORLD staff did a lot of research to turn up something new and unusual to set-off the annual catalog. After all, this is an unusually fine edition—one which deserved the final masterful touch of ancient, lost arts to lend it dignity.

The reproduction of the old wood engraving on the cover pictures an Egyptian silversmith, hard at work, making a new set of earrings for Queen Nefertit. The scene was reproduced from a scrap of papyrus found wrapped around a mummy, no doubt the silversmith himself. The Egyptologists say that it dates from the IV Dynasty, proving that the Smith family has been dabbling in silver for a long time.

Report from the Pacific

George O. Argall, Jr., editor of Mining World, will complete his extensive survey of mining and metallurgical installations in the Orient near the middle of this month. Now in Japan, his itinerary includes visits to the important titanium plants there, as well as to copper-zinc mines and smelters of the Mitsubishi Metal Mining Company, Ltd.; Sumitomo Metal Mining Company, Ltd.; Mitsui Mining and Smelting Company, Ltd.; and Nihon Mining Company. Side trips have been arranged for a first-hand glimpse of the Republic of Korea's modernized tungsten industry.



A tight schedule of island hopping in the Philippines, early in his trip, gave MINING WORLD

editor a good representative cross-sectional look at mining there. He visited the islands of Luzon, Palawan, Mindanao, Cebu, Masbate, Negros, and maybe some others that he forgot to mention.

From Manila, Mr. Argall indicated that gold operators are working harder that ever to produce metal. Grade is somewhat below prewar levels. Labor and material costs are up. Copper is the magic word today. There is a definite air of expansion throughout the Islands. New mercury discoveries look promising. There has been a high ratio of success in Philippine mining ventures when one considers that all financing has come from local sources. It appears that higher rates on Pacific shipping are in the cards. Shipping space has been tight also. As a result some operators have had trouble moving concentrates to smelting sites.

George Argall has been through the muggy heat of Manila to the cool, delightful, cloudy heights of Baguio. He has endured the discomforts of travel in the tropics, yet his reports are enthusiastic. Watch future issues of Mining World for eyewitness accounts of conditions, plans, and activities in the Orient.

We've Re-covered

This month MINING WORLD steps forth with a brand new front cover. The new look will be a regular feature of the magazine every month. We have, in effect, established a showcase, a place where you, the reader, can window shop for the contents of each issue.

The staff takes considerable pride in announcing the change since it represents another step in the never-ending process of improving the presentation of our journal. The busy reader gets a break because he can tell at a glance what's inside.

The photograph on this month's cover pictures a hydraulic moniter disintegrating lake bottom material (overburden) at Steep Rock's open pit operation. Rugged mining conditions and the relative isolated location at Atikoken, Quebec, led to the installation of a well planned maintenance program described in this issue. Next month it will be something else giving you a clue to what we are featuring.

Giving up the space on the front cover was a considerable sacrifice for both MINING WOBLD and the Eimco Corporation. However we feel the sacrifice is well worth while. The cover has been given back to the reader. Won't you drop us a line and let us know how you like the change?

To do a big job fast, they called on the DW21s



When the picture was taken, this Caterpillar DW21 had been working 20 hours a day, six days a week for six consecutive weeks. It and five other DW21s had to move four million tons of overburden in two months from a copper pit at Kimberly, Nevada. Much of the material was frozen and hard to work, and some grades were 10% adverse. The DW21s and No. 21 Scrapers, together with three Caterpillar track-type Tractors and a No. 12 Motor Grader on the job, are owned by Young and Smith Construction Co. of Salt Lake City.

What's back of choosing DW21s for a big job like this? First of all, according to Elmo Longstroth, superintendent for Young and Smith, there's the ability of the DW21 to stand up to rough usage. It's designed as a unit, and matched to scraper capacity, for long life and top efficiency.

Heart of the DW21 is its big CAT* Diesel Engine, with 275 HP (A.S.M.E.).

The DW21 is easy and fast to handle. With the No. 21 Scraper, it can turn in a 35-ft. roadway. The load is taken on quickly, with a live, boiling action, and ejected smoothly and positively. Conveniently grouped controls, hydraulic steering, good visibility—such features as these keep operators fresh and at peak efficiency.

Your Caterpillar Dealer will give you performance figures on the high-profit DW21. See him today — and count on him for prompt, dependable on-the-job service and genuine Caterpillar parts.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill., U.S.A.

CATERPILLAR'

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WILL DEMONSTRATE



Capitol Concentrates

ODM Must Make Another Time Study To Determine Manganese Recommendations

At recent hearings of the House Interior Subcommittee on Mining the members attempted to discover what functions will be delegated to the new Office of Minerals Mobilization. Considerable skepticism was expressed about the value of such

an organization.

Assistant Secretary of the Interior Wormser, testifying on his recommendation against the passage of the Mills bill to continue the purchase of domestic manganese, stated that he was not necessarily opposed to the bill, but until OMM has made a thorough study of the manganese situation he could not endorse such a program. When the subcommittee tried to pin Wormser down to a date at which the OMM could come up with a recommendation, he was extremely elusive and said that a study of other minerals was more urgent. The members never did find out when they might expect an answer. As ODM and OMM are in fact possessed of all the pertinent information (and ODM has been for a long time) it is difficult to understand why another study has to be made and why an answer could not be forthcoming in 10 minutes.

And, by the way, what happened to the "distressed area" clause in the President's Mineral Policy? Has it been lost sight of, or was there no

intention of ever putting it into effect?

• Buy American Investigation Is Needed

A bill introduced in the House of Representatives by Representative Kelley of Pennsylvania (H. Res. 166) calls for an investigation of the "manner in which the departments and establishments of the United States are carrying out the duties and responsibilities imposed on them under the 'Buy-American Act.'" It has received altogether too

little attention from the mining industry.

The investigation requested is badly needed. For many years the Buy-American Act has been more honored in the breach than the observance and there have been attempts to repeal it entirely. When it was incorporated in the Stockpile Act of 1946 various efforts were made to eliminate it and there are so many possibilities for agency exceptions that it never has been as effective as the authors of the Buy-American Act intended. The present Administration reduced the favorable margin from 25 per cent to 7.5 percent, though under the law 100 percent would be legal.

H. Res. 166 directs a determination as to "whether additions or amendments" to the Act "are necessary if American labor and American business are to receive the protection such Act was originally intended to afford."

• Firm Programs Stimulate Production

What can be accomplished under a program which really stimulates the domestic mining industry without looking at world prices too closely is seen by the results at the Mouat mine in Montana. The production of chrome at this mine last year, under a contract originally negotiated with DMPA, amounted to 123,000 tons out of a total United States production of 160,000 tons. The property is operated by the American Chrome Company which, having a total contract for 900,000 tons, can operate comfortably without fear of being cut off at the pockets at any moment.

The same situation exists regarding Montana tungsten production. A few years ago tungsten production in Montana was negligible. Today under the stimulation of a firm program at a firm price one mine alone has developed ore reserves of over 800,000 tons and shortly will have a concentrator capacity of 20,000 tons per month. This is a real improvement in the domestic mobilization base, but the economists at the Office of Defense Mobilization and the Bureau of the Budget are said to be biting their nails to the quick as each ton of mineral has to be paid for at prices over the world market

price.

• Committee Approves Copper Duty Suspension

The House Ways and Means Committee has reported favorably on the bill to continue duty-free imports of copper for three years to June 30, 1958. The bill would continue suspension of the 2 cents a pound import duty with the requirement that the President restore the duty if market prices fall below 24 cents for one month. Passage of this measure is getting to be a habit, but certainly no one can complain as long as the copper price remains where it is.

• Testimony Taken On Leasing Methods

Leasing methods and procedures were investigated at an Atomic Energy Commission hearing in Grand Junction, Colorado, late in March 1955. The industry witnesses, some of whom disagreed with the present AEC methods of granting leases, generally opposed an out-and-out lottery selection for fear that unqualified mining people might get leases and be incompetent to do a good job. Many witnesses, large as well as small, opposed the granting of leases

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Avenida Ejercito Nacional 458, D Colonia Chapultepec Morales Mexico, D. F. based on the highest bid royalty to the government. They maintained that conservative companies would not bid because speculators would pay more than good economic judgment dictates. A modified form of lottery where the chance selection would be made from a qualified group seem to meet with some favor. One witness of considerable influence in the uranium industry testified that AEC leases account for only about 10 per cent of the total production and therefore the whole question was relatively unimportant.

The Uranium Ore Producers Association complained that at present "the entire system is shrouded in secrecy" and that when leases are allotted to new-comers "resentment runs high" among many applicants who have successfully operated timeproved properties and have long-standing applications.

"The general attitude among the operators," according to testimony from a competent witness, "is that these government leases actually are the property of the public and that no small select group of individuals has the right to deal out these preferred goods on an arbitrary or discriminatory basis—least of all to carry on this manipulation of public grounds in such secretive manner as the present system embraces."

A great many witnesses were heard, but whether the hearing will result in procedural changes is anybody's guess.

• Will ODM Continue Lead-Zinc Purchases?

What will the Office of Defense Mobilization do about long-term lead-zinc stockpile purchases when the prices really firm up? Although ODM technically is buying "at the market" it is not following in spirit the President's directive "to buy at prices most advantageous to the government," because the action of ODM has helped to force prices up. The problem remains—at what point to go out of the market, and what will happen? It appears that the staff of ODM is by no means in agreement on this point.

What one might expect of Dr. Flemming, ODM director, seems to be in the making—the appointment of a committee to study the subject and to pass the buck to, one function at which ODM is quite adept. Unfortunately for Dr. Flemming, he has testified several times that in matters of this sort the final decision is his except for possible review by the White House. This whole affair could turn out to be quite a hassle!

COMING CONVENTIONS

- June 20 to July 3, 1955. Centenary Congress of the SOCIETE de L'INDUSTRIE MINERALE, Paris, France. Special sessions on mining, mineral discovery, and visits to French mining and metallargical operations.
- August 8 to 29, INTERNATIONAL CONFERENCE OF THE PEACEFUL USES OF ATOMIC ENERGY, sponsored by the United Nations, Geneva, Switzerland.
- October 3 through 6, 1955. Twenty-fifth annual meeting SO-CIETY OF EXPLORATION GEOPHYSICISTS, Shirley Savoy Hotel, Denver, Colorado.
- October 10 through 13, Annual meeting AMERICAN MINING CONGRESS, Las Vegas, Nevada.
- November 8 through 11, 1955, Annual Meeting AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC. Westward He Hotel, Phoenix, Arizona.

GM DIESEL CASE HISTORY No. 1A3-16

OWNER: Crowe Coal Company, Kansas City, Mo.

INSTALLATION: Six GM Dieselpowered Dart trucks . . . three 20-ton rear-dumps and three 40-ton bottomdumps. GM Diesel-powered Bucyrus-Erie #38-B shovel with 21/4-yard bucket. The company also operates three 20-ton bottom-dumps powered with 4-cycle

PERFORMANCE: GM Diesel-powered trucks have faster pickup, respond to throttle controls better, use less lube oil. Engines take less time-cost less to overhaul. Shovel strips 1000-1200 tons of coal in 71/4 hours -- burns 4 gallons of fuel per hour.

Quicker Pickup-Faster Hauling



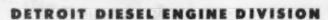
MISSOURI's Crowe Coal Company operates nine trucks—six powered by General Motors 2-cycle Diesels and three with 4-cycle Diesels. They report the GM Diesel-powered trucks "respond quicker, use less lube oil, are easy to overhaul."

A General Motors Diesel does "respond quicker." It gets more work done than most engines, partially because of its 2-cycle "power on every piston downstroke" design. It costs less to buy. It costs

less to maintain because GM Diesel replacement parts cost less (valves up to 62% less and cylinder liners up to 40% less) than parts for comparable Diesels.

Today you can get GM Diesel power in more than 750 different models of equipment built by over 150 manufacturers. Call in your local GM Diesel distributor or write direct for more information.

It Pays to Standardize on



GENERAL MOTORS . DETROIT 28, MICHIGAN Single Engines . . . 30 to 300 H. P. Multiple Units . . . Up to 893 H. P.



Why they picked the HT4 at ATOMIC KING #2

Everett j. Robinett
is one of five partners
in Dove Creek Uranium Co.
Another hard-working
"partner" is this
Caterpillar HT4
Traxcavator.





We chose the Caterpillar HT4 Traxcavator because we had a mighty rough job to do and we knew Cat could do it," says Everett J. Robinett, a partner in Dove Creek Uranium Co. Their mine, Atomic King No. 2, is 30 miles southwest of Moab, Utah, site of the first uranium bonanza.

"We've owned Caterpillar machines before," Mr. Robinett continues, "so we know what they can do. Another factor is the service we get from our Caterpillar Dealer."

Atomic King No. 2 is a fissure-type vein, located near a fault, about 70 feet deep and of undetermined width. In two short months the CAT* HT4 Traxcavator* removed overburden, dug the drift entrance, and loaded out about 700 tons of .25% uranium ore.

Performance like this takes a machine that is tough and versatile. The HT4 is rugged for work around equipment-busting rock. Its 1¼-yd, bucket has a longwearing, high-carbon-steel cutting edge, the lift arms are rigidly braced. The hydraulic system is completely enclosed to keep dirt out and oil in.

The HT4 is compact and low in height for work in tight places. It has excellent operator visibility and easy, fast-handling controls for low cycle times. It can dig, load, clean up, and do bulldozing work.

Your Caterpillar Dealer, who provides fast service and genuine factory parts, will show you how the Caterpillar HT4 Traxcavator can pay for itself in a hurry on your mining operation. Give him a call today.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill., U.S.A.

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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

June 1955

INTERNATIONAL PANORAMA

GRAND JUNCTION, COLORADO—The United States Atomic Energy Commission has paid more than \$5,000,000 to domestic uranium producers for initial production bonuses. A total of 538 mines have received 2,889 payments. Of these, 91 mines have received full payment of \$35,-

PARIS, FRANCE—Societe Internationale d'Etudes et de Cooperation Industrielle, representing joint French and German capital, is reported to have sent a technical mission to Ganon, French Africa, to examine the iron ore deposits of Mekambo. Bethlehem Steel Corporation is one of those said to be interested in the deposits.

LONDON, ENGLAND—Small amounts of gold have been offered by Soviet agents on the London market for the first time in more than 12 months. The Soviet Union has also been selling silver in London since

SPOKANE, WASHINGTON—Newmont Mining Corporation has taken over exploration and development of the Midnite uranium mine owned by Midnite Mines, Inc. on the Spokane Indian Reservation and will form a new company to operate it.

LAWTEY, FLORIDA-The \$3,000,000 mine and plant of E. I. duPont de Nemours & Company has started production of ilmenite. The plant is operated by Humphreys Gold Corporation for duPont and is expected to add another 72,000 tons per year to the 96,000 tons already being produced by the nearby Highland plant.

BATTLE MOUNTAIN, NEVADA-Vernon Pick, famous Colorado uranium millionaire, has undertaken a mercury exploration program in the Ivanhoe mining district.

TRANSVAAL, UNION OF SOUTH AFRICA-West Rand Consolidated Mines Ltd. will sink a rectangular, three-compartment shaft to provide additional ore for its expanded reduction plant. The latter's capacity has been increased from 40,000 to 700,000 tons a month.

NEW YORK, NEW YORK-Atlas Corporation has signed a contract to buy \$1,265,625 worth of treasury stock of the Northern Australia Uranium Company if an examination of the property by Atlas representa-tives proves satisfactory. The money would help to develop the property

SALT LAKE CITY, UTAH-The Ruddock uranium interests in San Juan County, Utah, have been sold to a Utah-Wyoming syndicate for more than \$10,000,000. Involved are 785 claims in the Big Indian and Moab areas, including the San Juan shaft where large ore reserves have been indicated.

JOHANNESBURG, UNION OF SOUTH AFRICA-Vaal Reefs Exploration and Mining Company Ltd. established a new world shaftsinking record for all types of shafts in March with an advance of 667 feet. This was achieved in the vertical ventilation, 18-foot-diameter, circular component of the No. 1 twin shaft system. Previous record had been made by Merriespruit No. 2 shaft which involved the use of a cactus-type grab in advancing 597 feet.

ULEFOSS, NORWAY-A/S Norsk Bergverk is expanding its plant at the Soeve columbium ore fields to give a monthly production of about 30 tons. Present output is 15 tons of 50 percent Nb₂O₅ concentrate per

INSPIRATION, ARIZONA—Inspiration Consolidated Copper Company will spend \$3,600,000 on an expansion and improvement project for its property and plant at Inspiration. Capacity of the concentrator will be increased to 16,000 tons daily.

LA PAZ, BOLIVIA-The Bolivian Government has ordered the Corporacion Minera de Bolivia, which operates the nationalized tin mines, to work out incentive plans for increasing production, and has authorized the Mining Bank to increase prices for output from small- and mediumsized privately owned mines.

CEBU, REPUBLIC OF THE PHILIPPINES-Atlas Consolidated Mining and Development Corporation started milling its second 100,000th ton of ore late in April at its 4,000-ton-per-day flotation plant. First ore was milled on February 23rd.

Pick Starts Exploration For Mercury in Nevada

Vernon Pick, Grand Junction, Colorado, uranium millionaire, is reported to be setting up a mercury exploration pro-

be setting up a mercury exploration program in the Ivanhoe mining district near Elko County, Nevada.

Mr. Pick, head of Pick Uranium Company and Pick Mining and Electronic Enterprises, Inc., has a prospecting permit involving three properties, the Silver Fox, Silver Cloud, and Buttes claims. Silver Fox and Buttes were operated by L. V. Pangborn during World War II. Newmont Mining Company operated the Silver Cloud property during the same period.

Roy E. Taylor of Grand Junction is in charge of the Pick operation and has brought heavy equipment into the dis-

Nchanga Decides To Mine Low-Grade Cu Ore Body

Nchanga Consolidated Copper Mines Ltd. at Kitwe, Northern Rhodesia, has decided to mine its upper, low-grade ore body by open-pit methods, with stripping to begin shortly, and ore recovery expected by the end of 1956. It is planned to mine about 150,000 tons per month, involving removal of 7,000,000 to 8,000,000 tons of overburden.

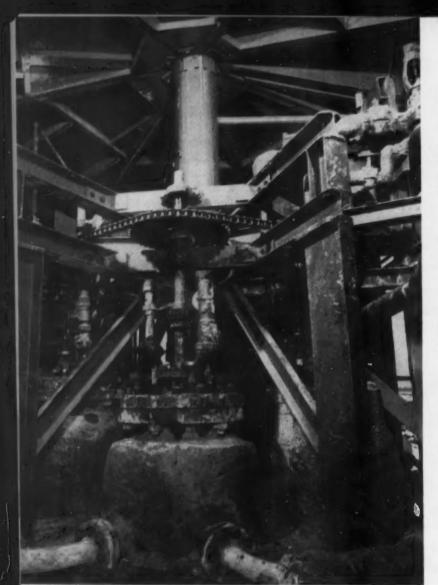
000,000 tons of overburden.

As has long been known, Nchanga has two ore bodies—a lower one called Nchanga West which has about 37,000,000 tons of approximately 7 percent Cu; and an upper one called the Nchanga with nearly 90,000,000 tons of just under 3.5 percent Cu. Mining has been from the smaller and richer ore body which is considered a bad practice if continued for any length of time. The new policy now is to draw ore from both ore bodies, the richer one by the present "continuous cave" system, and the lower grade body by open pit, to bring the average mined grade down to the average grade of the total reserves, without reducing total coptotal reserves, without reducing total cop-

Anaconda Finds Low-Grade Copper Ore Body at Butte

Anaconda Copper Mining Company has located a low-grade copper ore body southeast of its main Kelley mine ore zone at Butte, Montana. A potential reserve of about 100,000,000 tons has been indicated by work done to date, and it appears that the deposit may be mined by open-pit methods.

Additional development at the Kelley Greater Butte Project has increased ore reserves to more than 160,000,000 tons. This is an increase of 30,000,000 tons from the last previous estimate. Output from this project is nearing the objective of 15,000 tons per day.



Salt Lake Tungsten Company's Custom
Plant Treats Low Grade Concentrates
To Produce

SYNTHETIC

By BLAIR T. BURWELL

New equipment and processes providing higher recovery from tungsten ore and concentrates are now being used at The Salt Lake Tungsten Company's refinery at Salt Lake City, Utah. Construction of this refinery now makes it possible for many tungsten mine operators in Utah, southern Montana, and eastern Nevada to operate more economically. These mines can now produce a lowgrade concentrate of about 10 percent WO3 with a much higher recovery than was previously possible when producing a 65 percent WOs product. These low grade concentrates are then treated in the Salt Lake plant to make a saleable synthetic

The refinery of The Salt Lake Tungsten Company in Salt Lake City, Utah, began operations in late 1953, and increased its thruput during the year as tungsten mining was increased in the intermountain area. The refinery is owned jointly by the Sylvania Electric Products, Inc., and Minerals Engineering Company. This plant treats tungsten concentrates from Minerals Engineering Company's Glen, Montana operation as well as from other mines in Utah, Nevada, Colorado and Arizona. Minerals Engineering Company's Montana tungsten operation was recently described in the January 1955 issue of MINING WORLD.

During World War II, Salt Lake City was established as a tungsten refining center by the Metals Reserve Company to assist the domestic tungsten mining industry in meeting war needs. The location combined cheap chemical supplies with newly discovered tungsten mines at Yellow Pine in Idaho, Getchell in Nevada, and other western mining districts. The new Salt Lake tungsten plant is located on a portion of the site used by the wartime plant for tailings disposal. It is basically a restoration of the original plant and uses the same principle of upgrading and refining as the original wartime Salt Lake plant and the Bishop, California plant of the United States Vanadium Corporation.

Objectionable Impurities

Ore containing tungsten as scheelite (CaWO₄) constitutes the largest part of our potential domestic reserves, and probably the same can be said of

Mr. Burwell is Superintendent of Salt Lake Tungsten Company.

PRESSURE REACTOR, at top, digests tungsten concentrates with soda ash. This view shows the reactor drive mechanism.

world reserves. The majority of the large tonnage mines of the world are of the scheelite type. Scheelite deposits, however, have four handicaps which have delayed their utilization in spite of the size of the deposits and their abundance.

First, the majority of scheelite ores contain a host of impurities objectionable to tungsten users, such as molybdenum, phosphorus, arsenic, copper, antimony, and bismuth. Only a few of the deposits are low in such impurities. Second, the scheelite mineral is friable and easily reduced to a slime when the ore is ground sufficiently to free the mineral. Thus, when mechanical means of separation are employed, such as jigs and tabling, poor recoveries due to slime losses result, or middling products are produced which cannot be marketed directly. Third, although scheelite ores can be floated more readily than other tungsten minerals, such as wolframite, huebernite, or ferberite, the flotation reagents which are effective in making a high recovery of the fine scheelite are also effective in concentrating other minerals such as fluorite, powellite, and oxidized molybdenum or copper minerals. Therefore, when flotation is employed to obtain a reasonable recovery of scheelite from the ores, the operator finds himself in a difficult marketing position.

Low-Grade Deposits

The fourth disadvantage is that scheelite deposits, although often larger than other types of tungsten deposits, are usually low grade, requiring large capital investments in development and facilities. In the United States the present average tungsten content of major scheelite deposits will vary between 0.30 percent and 0.75 percent WO₅ with an average usually below 0.50 percent.

The main source of world supply of tungsten prior to 1937 was from surface deposits of alluvial type where the harder tungsten minerals, principally wolframite, were easily and cheaply obtained in a high purity concentrate from the natural process of weathering and placer washing. Since 1937 high purity and cheap tungsten ores have become scarce, and the result has been ever increasing research to improve milling and refining processes to increase recovery from scheelite ores and to purify the concentrates from such processes.

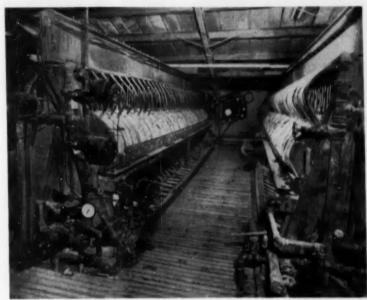
Evolution of Process

JUNE 1955

The process used at The Salt Lake Tungsten Company is the result of such research on a Russian discovery that scheelite could be readily and selectively dissolved in dilute sodium carbonate solutions under heat and pressure. The Russian process involves two phases, the first of which is upgrading slimed tungsten from scheelite flotation mills into a product containing 60 percent WO₃ or better. The second is purifying that product to

meet the various market needs presented by the powdered tungsten producers or the steel industry.

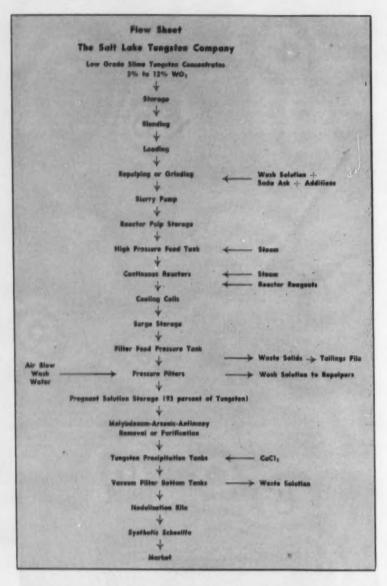
The chemical processing of tungsten is an operation auxiliary to a tungsten mill, and is an integral part of the mill flow sheet. This is typified by the Bishop plant of the United States Vanadium Corporation, in which the flotation of scheelite is carried on



PRESSURE FILTRATION of leach slurries provide fast, efficient washing and dewatering of the cake. The Eimco-Burwell filter is an improved design of the plate and frame principle. Automatic time valving allows one operator to control the bank.



DUMPING position of the frames is shown in this picture. Each set of thirty frames is mounted on a shaft which rotates them into position between the plates at the beginning of the cycle. The sealed frames are then loaded under pressure.



to produce a low-grade flotation product, and a mill tailing low in tungsten, while maintaining a high recovery of 90 to 95 percent in the concentrator operation. Flotation concentrates then flow directly to chemical processing without an intervening shipment. In this circuit there is no penalty for handling low-grade material, and as the chemical process works best on low-grade material (10 percent), a complete and low-cost tungsten operation emerges. Due to this advantage, the 1,300-ton plant of the United States Vanadium Corporation at Bishop, California, is probably the largest single producer of tungsten in the world today.

Where mill products must be pro-

duced and transported, the flotation control to produce higher grade concentrates (and thus lower transportation costs) must be balanced against higher tailings losses involved in such a procedure. In favorable ores, as typified by the well-operated Nevada-Massachusetts operation at Mill City, Nevada, flotation is practiced to produce a concentrate high enough in grade to allow the leaching of lime and phosphorous impurities by hydrochloric acid. This leaves a residual tungsten concentrate of marketable grade which is suitable for the steel industry or the present G.S.A. market, Producing high-grade primary concentrates suitable for acid leaching is usually accomplished by leaving more tungsten in the tailings or at the expense of recovery.

Salt Lake Process

The Salt Lake Tungsten Company has evolved from necessity for a custom chemical processing plant; that is, it meets the need of upgrading tungsten flotation concentrates from a number of mills, widely scattered, which initially cannot afford, nor are equipped with such process equipment to treat their mill products locally. A general description of the flow sheet of the Salt Lake tungsten plant follows.

The majority of the concentrates, as previously stated, come from the Glen, Montana mine and mill of Minerals Engineering Company; smaller portions of the feed come from Ely, Nevada, the Bauer plant of Combined Metals Reduction Company, the Moody Brothers and Metcalf Mill of Delta, Utah, low-grade ferberites from Boulder County, Colorado and other small shippers. The concentrates are received by rail or truck, weighed and sampled, then stored on a large concrete slab, from which the various concentrates are loaded and mixed together to give a uniform feed to the mill. Flotation or tungsten slime concentrates are pulped with a predetermined amount of sodium carbonate and the wash water from the filtering operation in a repulper to produce a slurry containing about 50 percent solids and 7 percent WO3.

Digest in Pressure Reactors

In the case of tungsten-bearing material where the tungsten is coarse, a ball mill and classifier are used to grind the material to approximately minus-300-mesh, at which fineness it can be fed to the digestors.

The concentrate after being pulped is pumped to a surge tank and fed from there by gravity to a pressure vessel where high pressure steam is then introduced to force the charge into the reactors. The reactors at The Salt Lake plant are a group of stationary vertical pressure vessels connected in series through which the pulp passes in a continuous flow. Heat is introduced and the temperature is increased as it passes from one vessel to another until the reacting temperatures and pressures are reached. The reaction as carried out in the pressure vessel is usually given as:

 $CaWO_4 + Na_2CO_3 \xrightarrow{\text{Heat}} Na_2WO_4 +$ $CaCO_3 \xrightarrow{\text{The mechanism of the reaction is}}$ The mechanism of the reaction is probably first:







MEN WHO SUPERVISE OPERATIONS at Salt Lake Tungsten Company are left to right: Blair T. Burwell, superintendent;

Earl O. Torgerson, assistant superintendent; and I. W. Wingo, plant foreman.

 $\begin{array}{c} {\rm 3Na_2Co_3 + H_2O} \xrightarrow{\rm Heat} {\rm 2NaOH} + \\ {\rm 2Na_2CO_3 + CO_2} \end{array}$

In the second equation, the ratio of NaOH to Na₂CO₃ is in equilibrium with the heat energy. In a closed vessel the digestion is probably effected by the concentration caustic soda; the CO. recombines with NaOH during cooling to form carbonate and bicarbonate. The reaction is best adapted to scheelite ores, but can be used for other tungsten minerals by using caustic soda solutions. Utilization of this reaction requires close attention to the mechanical application of heat andpressure to an abrasive solution. The inability of the original Russian engineers to use it was largely due to mechanical failures in its application.

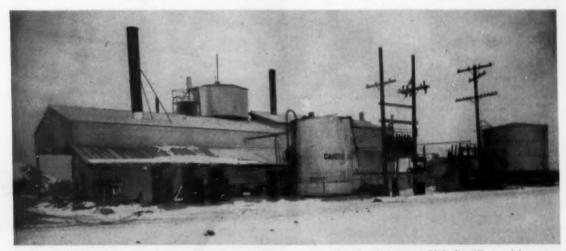
Critical to this reaction is heat and the concentration of sodium hydroxide and sodium tungstate. The rate of conversion of CaWO₄ to Na₂WO₄ decreases with increasing concentration of sodium tungstate. The reaction rate therefore limits the process to lowgrade material under 15 percent as higher grade concentrates require multiple treatment.

Controls Required

As the reaction proceeds at temperatures below the critical levels required to convert fluorine, tin, or other impurities to soluble sodium salts, the chemical attack is selective on tungsten and molybdenum minerals if proper controls of the pressure reaction are maintained. Arsenic and antimony, and some phosphorus minerals are partially attacked; however, lead, copper, and other metals are not affected. Automatic temperature controls are used on the reacting vessels to maintain a high reacting efficiency. The material is discharged from the digestor through a series of cooling coils or heat exchangers and is then allowed to flow into a Surge Tank of about 28 tons capacity. This surge tank allows reactor operation to be independent of the demands of the filtration section of the plant.

Filtration

The discharge from the surge tank goes to a large pressure vessel and is placed under an air pressure of approximately 60 pounds per square inch. The slurry or pulp is forced from the pressure vessel to either one of the two Eimco-Burwell pressure filters. These filters are newly designed to accomplish controlled washing and a fast dumping, pressure-filtration of the slime material from the digestor discharge. Each filter consists of a series of 30 frames mounted on a revolving shaft: the shaft rotates the frame assembly between 31 expandable plates during each cycle. These plates are closed on the frames with air pressure of 65 pounds per square inch, which in our case is approximately 15 pounds more than the feed pressure. This material is then introduced into



WEST SIDE of tungsten plant shows reagent storage tanks, transformer banks and pregnant solution storage tank at ex-

treme right. The plant was established to fill a need for custom processing of low grade scheelite concentrates.



PRECIPITATED SCHEELITE for the steel industry is stockpiled while waiting shipment. The specifications for the product used in steel are liberal compared to more rigid standards for making powdered tungsten.

the bottom of the frames by an automatically controlled valve to avoid segregation or sanding. Loading of the frame is metered so as to produce a separate cake on each filter surface with a division or "split" between the cakes.

After the feed cycle, high pressure air is then introduced through the same feed channel into the frame. This blows the valuable tungsten-bearing solution from the cake leaving a relatively dry cake. Wash water is then introduced in the same manner. This is followed by a blow-cycle to produce a final cake containing very low soluble values. Residual cakes usually

contain less than 15 percent moisture or about 30 percent less than can be obtained on a vacuum filter.

The highly efficiency wash results in the production of a highly concentrated liquor and enables increased metallurgical efficiency in the subsequent solution recovery steps. In plant practice, the filtering efficiency exceeds 99.8 percent when using one ton of wash water per ton of feed. The filters were originally operated by manual control, but automatic time valving now installed allows one filter operator to control the filter bank. The filter cycle consumes 23 to 30 minutes, with the capacity of each filtering unit

varying between 30 and 35 tons per day.

Solution Impurities

The removal of impurities from the solution following ore decomposition, usually deals with molybdenum, phosphorus, arsenic, and antimony. Of the four, phosphorus is the most troublesome. This is especially true if acid has been used in any prior steps on the material, or if the circuit controls are not carefully maintained. In most ores, phosphorus can be repressed by reactors controls. Molybdenum can be removed almost completely as MoS3 by precipitation with hydrogen sulphide and filtration from the plant solutions, or partially removed by forming a complex thio-molybdate salt which does not precipitate with the tungsten when lime is added.

Precipitation

After the tungsten is converted to a soluble sodium tungstate, it is usually recombined with lime in the form of calcium oxide or calcium chloride to form synthetic scheelite. The chemical precipitate is nodulized to prevent dusting and finds a market in the production of ferro tungsten or is used directly in the furnace to produce tungsten tool steel.

Synthetic tungsten can be produced from this type of chemical process to meet the specifications any particular



AT FEED END of the refinery, coarse, granular tungsten concentrates are ground to minus 300 mesh before feeding to the

pressure reactors, Other fine concentrates are repulped, then transferred to storage tanks before pressure leaching.

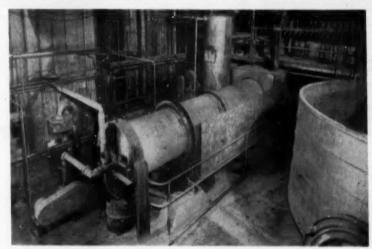
market requires. During the war, synthetic scheelite low in molybdenum was required and the product produced from this process averaged 70 percent WO₃, 0.10 percent Mo, 0.2 percent P, 0.30 percent S, nil As, Sb. Cu, Pb, Bi. A total in excess of 18, 000,000 pounds of high purity product has been produced by this type of tungsten refining.

At the present time, the government molybdenum specification on tungsten for the stockpile is 2.75 percent which temporarily makes it unnecessary to remove molybdenum to very low limits. Today, the use for tungsten in steel is decreasing in ratio to the use in powdered form, such as tungsten powder and cemented tungsten carbides. In the tungsten powder market, specifications on molybdenum are very rigid and a product suitable for steel usage has no sale in the growing powder field. Producers of tungsten products in the powdered tungsten market now obtain high purity, low molybdenum ores by selective purchases and convert these concentrates to sodium tungstate as a starting point in the production of tungstic acid. ammonium para tungstate, tungsten metal powder, and tungsten carbide.

The tungsten produced in The Salt Lake Tungsten Company plant at this time is the result of converting plant solutions of sodium tungstate to synthetic scheelite which meets the present liberal high speed steel market and G.S.A. specifications. This refinery also has facilities for producing high purity products for the powdered tungsten industry.



SALT LAKE TUNGSTEN REFINERY is modeled after process developed by the Russians. The large tank at the left stores pregnant solution making independent operation of reactors and filters possible. Also shown is a gas scrubber and filter tank.



CHEMICALLY PRECIPITATED synthetic scheelite is dried and nodulized in the rotary kiln to prevent dusting losses. In the right background is shown the filter press section. A gas scrubbing tower is located near the feed end of the kiln.

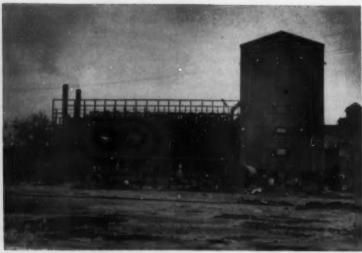


EAST SIDE of Salt Lake Tungsten Company's tungsten refinery. The waste liquor pond is shown in the foreground. The con-

crete structure at the left of the building is a vacuum filter bottom tank where synthetic scheelite is recovered.



HEAVY DUTY plate feeder draws mine run ore from the bin. The hard ore is reduced to 3-inches in a Telsmith crusher.



FLEXIBILITY was incorporated in Almaden's prefabricated mercury plant. The two Pacific, multiple hearth furnaces, housed in building at right, can be operated independently for maximum efficiency. Each furnace has an "oversize" condenser.

Mercury - New Prefabricated Plant At Almaden Adds to World Metal Supply

By C. S. RANKIN

The famous Almaden mercury mines of Spain, with a history of continuous operation extending over 2,000 years, are now furnacing ore in a new and modern Pacific Mercury Plant. With a guaranteed rating of 225 tons of ore per day and a recovery efficiency of at least 95 percent, this plant has been in continuous and satisfactory operation for the past year.

Although preliminary inquiries were made by Almaden as early as 1946, it was not until April 1951 that a definite invitation to bid was presented to the Pacific Foundry Company, Ltd., of San Francisco, California, and to other concerns in the United States and Europe. After personally visiting the fabricating plant of each bidder, the decision to purchase the Pacific Mercury Plant was made by Srs. Manuel Ocharan, president, and Laureano Menendez y Puget, director, of the Consejo de Administracion de las Minas de Almaden y Arrayanes.

The preliminary survey of the plant site and the overall plant layout re-

quired several months' time. Early in 1952, the final contract was signed and actual work on the design and fabrication of the new plant started.

Design Considerations

Among mercury ores, the Almaden ore is unique in that much of it is extremely rich. Frequently, this ore contains as high as 30 to 40 percent mercury, some of which is native mercury. Such rich ore presents a special problem in plant design, particularly where it is desired to maintain maximum capacity daily furnace operation. It is essential that the furnace and condenser sizing be adequate to meet the changing conditions presented by fluctuations in the grade moisture content of the ore. For this reason, prior to the actual detailed specifications for the furnace, condenser, and accessory equipment, a complete heat balance was prepared.

Based on an assumed fluctuation in the grade of the ore, moisture content, and daily tonnage, this heat balance presented a firm basis on which to actually design the furnace, burner equipment, dust collector, condenser system. In any well-designed mercury plant three things are important:

- The furnace must be capable of volatilizing all of the mercury in the ore before discharging a mercury free calcine.
- The condenser system must be capable of condensing all of the mercury vapors, thereby making an efficient recovery of the mercury.
- The operating and working conditions must be such that the men are not subject to the hazards of mercurial poisoning.

The plant layout and design were the responsibility of J. Wissing and C. S. Rankin, engineers, under the personal supervision of H. J. Hartley, president of the Pacific Foundry Company, Ltd.

Flexibility of Operations

To assure flexibility of operation, close attention was given to the plant layout and the type and positioning of the equipment. Essentially, the plant is built in four sections:

- Mine-run ore storage and crushing facilities.
- Crushed ore storage, elevating and conveying equipment, and ore storage above the furnaces.

Mr. Rankin is Engineer for the Pacific Foundry Company Ltd. with headquarters in San Francisco, California

- Two individual furnaces and condenser systems, each of which can be operated independently of the other.
- Individual calcine storage and calcine handling equipment for each of the furnaces.

Such an arrangement has obvious advantages: The mine can deliver ore to the plant at any time. A single crushing crew, working one six-hour shift, can crush and store ore for a 24-hour operation of the furnaces. As each furnace and condenser can be operated independently of the other, it is possible to maintain maximum operating efficiency with wide variations in the tonnage of ore being furnaced. Reasonable calcine storage is provided, thus allowing for periodic rather than continuous operation of the calcine disposal cars.

Plant was Prefabricated

After considerable discussion and preliminary investigation, it was decided to prefabricate the entire plant in Pacific's shops in San Francisco and to make such preliminary sub-assemblies as would assure easy erection in the field. This prefabrication technique was carried out for all of the equipment, including the furnace, condenser, duct work, and ore handling conveyors, elevators, and bins. It was omitted only on such items as the crushers, fans, and dust collectors which were purchased from other manufacturers.

To facilitate erection in the field and rapid identification of the equipment, each individual part of an assembly was identified and backmarked showing its proper relation to the matching part. Bills of material, complete to the last nut and bolt, were prepared for each piece of equipment and detailed erection drawings showing the field assembly procedure were provided.

Erection at Almaden

The ease with which the erection of the plant proceeded proved the soundness of the decision to prefabricate and back-mark. Almaden is remote from the industrial centers of Spain and for this reason heavy equipment, such as cranes and bulldozers, were not available. It is a sincere compliment to the Spanish engineers and workmen that this plant which would have required five months to erect in the United States, was actually erected in Almaden with a minimum of erection equipment in less than seven months. All erection work was done by workmen and laborers native to Almaden.



DETAILS of an inclined manifold which connects the condenser hopper bottoms. The manifolds discharge mercury condensates into a launder under a water seal. The metal which passes through the trap at the water seal is collected in a sump.

In charge of the mine and the new plant is Don Luis Pancorbo Tercero, engineering director of Minas de Almaden, assisted by Don Ricardo Martin Gallego and Don Luis Lopes Doriga, engineers. The Pacific Foundry Company, Ltd., was represented by Lyle S. Messer, mining and mechanical engineer, who supervised the erection of the plant. During the final erection and start-up, Mr. Messer was assisted by C. S. Rankin.

Flow sheet is simple

The flow sheet of this mercury plant is direct and simple. The ore from the mine enters the crushing plant and is reduced to a size smaller than one inch. Adequate storage of the crushed ore is provided in order that the furnaces may operate continuously. The ore passing through the furnaces is heated to a temperature which assumes volatilization of all of the mercury. The combustion gases containing the mercury vapor pass from the furnaces into the condenser systems where the mercury is recovered. The roasted ore (calcine) discharges from the furnaces into receiving bins from which it is discharged and conveyed to the dump.





LEFT: WOODEN COOLING towers collect final particles of mercury from condenser gas stream. The court in the foreground reflects the pride Almaden takes in its plant. The secondary crushing plant is shown in the view on the right.

At Almaden, the ore is hoisted from two shafts which are located about %mile from the plant. An electric locomotive trams the loaded ore cars into the weigh-house where the individual cars are weighed and then discharged into a 200-ton, concrete, mine-run bin.

Crush on One Shift

The mine-run bin serves a double purpose as a storage bin and as a surge bin for one. This is important because the working schedules in the mine are independent of the furnacing plant. Sufficient ore is crushed in one six-hour shift to supply both furnaces for 24 hours at rated capacity. A heavy-duty, 30-inch, reciprocating plate feeder under this bin successfully handles ore as large as 12 to 15 inches in diameter as well as the wet and sticky muck which occasionally comes from the mine. The fine ore passing through the grizzly is discharged by a chute onto a conveyor belt. Grizzly oversize is crushed in a 14- by 24-inch Telsmith jaw crusher to an average size of minus 3 inches. Both the crushed ore and the fine ore are continuously conveyed from the primary crushing station to the secondary crushing station by a 20-inch inclined belt conveyor. Magnetic pullevs on the conveyor protect the secondary crusher by trapping any stray tramp iron.

A scalping screen at the conveyor discharge removes all minus %-inch ore and discharges the oversize into a Telsmith No. 24 gyrasphere which reduces it to a minus %-inch. Both the scalping screen and the gyrasphere discharge into a chute leading to a bucket elevator which elevates the ore some 80 feet into a round, covered, steel, crushed ore bin of 250 tons capacity.

Crushing Personnel Rotated

The Almaden ore is extremely hard and there is more than normal wear on the crushing and elevating equipment. A certain amount of dusting seems to be inherent to the crushing operation and this, coupled with occasional native mercury in the ore, creates a health hazard to the crusher men. Almaden combats this by providing, and insisting that the men wear protective masks, and by frequent rotation of crusher men.

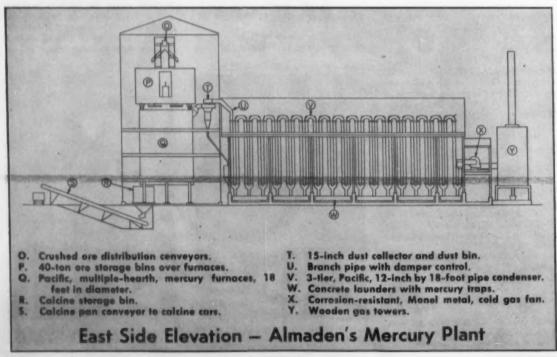
Immediately upon coming on shift the operator fills the ore storage bins above the furnaces. Ore is drawn from the crushed ore bin by a 24-inch pan conveyor with a regulating gate so arranged that the drawoff is constant. The ore is discharged into a special chute built as an integral part of the elevator boot. Here a 48-inch heavyduty Geary-Jennings sampler, operating at two-minute intervals, continuously samples the ore by taking a cut across the discharge from the pan conveyor into the elevator.

Feed Distribution

An eight-hour supply of crushed ore for the furnaces is stored in double-compartment bins which are located directly over each furnace and supported by the furnace shell. A feeder automatically discharges the correct amount of feed from the storage bins onto the drying hearth of the furnace. This feed rate can be varied -from minimum to maximum-by adjusting two feed knives which regulate the amount of ore discharged from the bins for each revolution of the furnace shaft. As the ore is rabbled continuously in a thin bed across and around the drying hearth it loses some of its surface moisture and is preheated slightly before it is discharged into the furnace through self-sealing feed ports.

Multiple Hearth Furnaces

The two 18-foot, outside-diameter eight hearth Pacific furnaces are of the very latest design and incorporated all



of the features which assure maximum efficiency, fuel economy, and furnace capacity. Completely encased in a steel shell and provided with permanent gas seals, the furnaces are tight, assuring the control of excess air which is so important to an efficient mercury furnace. Long, continuous, furnace operation is certain because each furnace is equipped with quality refractories, and the furnace shaft, arms and teeth are made of special heat resisting alloys. Adequate insulation effectively reduces heat losses.

Two Hauck, low-pressure, oilatomizing, oil burners are provided on hearth Nos. 3 to 8 inclusive. These are proportioning burners and require no adjustment over full operating range after having once been set to the proper oil and air ratio. Each burner is mounted on a swing-type burner box which is so designed that both the tile and the burner can be cleaned in a few moments. Air at 24 ounces gauge pressure is provided by Spencer turbines. A gas-oil is now used as fuel but preheating equipment for heavy oil is available on a standby basis. The burners on hearth Nos. 7 and 8 are used only for bringing the furnaces up to temperature and are then shut off. Maximum temperatures are maintained on hearth Nos. 4, 5, and 6. The burners on hearth No. 3

are used for regulating the gas outlet temperature.

Sealed Feed Inlet

After entering the furnace through the sealed feed inlets, the ore is rabbled around and across the furnace hearths constantly exposing new surfaces to the heated furnace gases. An oxidizing atmosphere is maintained and the through put time of the ore in the furnace is sufficient to assure complete volatilization of the mercury, and oxidation to SO2 of the sulphur from the disassociation of cinnabar and pyrite. Maximum ore temperature of approximately 1,350° F. is reached on hearth No. 6 with hearth Nos. 7 and 8 used as soaking hearths. The roasted ore, from which the mercury has been completely eliminated, is continuously discharged from the furnace into a sealed and brick-lined receiving bin. It soaks in this bin for approximately one hour, releasing much of its heat back into the furnace. The calcines are periodically drawn from the calcine bin by a pan conveyor, discharged into calcine cars, and trammed to the calcine dump.

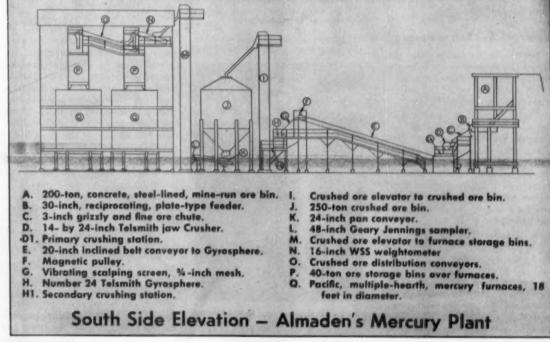
The mercury-laden gases from the furnace exit through a gas outlet on hearth No. 1 and pass through a 15inch Sirrocco dust collector where they are stripped of dust. The dust collector, and dust bin are provided with sealing valves so the bin can be emptied without interfering with the furnace draft. Leaving the dust collector, the gases pass through a dampered branch-pipe into the condenser system.

Large Condenser System

Because of the richness of much of the Almaden ore, the condenser systems are oversize as compared to standard United States practice. Each condenser consists of 99 vertical 12-inch diameter pipes, 18 feet long, divided into three banks and connected at top and bottom with cast iron return bends and hoppers. Thirteen inclined manifolds connect the hopper bottoms of the three condenser banks and discharge the condensates into the launder under a water seal.

Each return bend and hopper bottom is provided with two cleanouts readily accessible to the operator. The flow of gas through one condenser bank can be diverted into the other two momentarily thus facilitating cleaning or washing of the condenser without shutting down the furnaces.

Water cooling of the condenser is not practical because of water shortage in the area, so the condenser de-





FURNACE CALCINES drop through seals to a brick lined receiving bin. Following a soaking period of one hour, it is removed by pan conveyor and transferred to cars for disposal.



A PAN CONVEYOR with regulating gates on the crushed ore bin maintains a constant draw off for representative head sample. Ore is discharged to elevator for transfer to furnace bins.

sign provides for maximum air circulation and cooling around the individual condenser pipe. The condenser area has always been sufficient, even at maximum furnace tonnages and high ambient temperatures.

The inclined manifolds into the launder have mercury traps at the water seal. Free mercury passes through these traps into the launder where it collects in a sump. Pipe, leading from the sump, conveys the mercury to the magazine which is located several hundred yards from the plant. The condenser mud is hoed in the launder to free additional mercury and the residue scraped into buggies and delivered to a soot hoeing machine. Approximately 70 percent of the mercury is recovered as free mercury from the condensers.

Gases Washed before Venting

Suction on the furnace and condenser is provided by a corrosionresisting, high efficiency fan made of monel metal. The cooled and stripped gases from the condenser system pass through a wooden manifold into the fan and are discharged into a 10-foot diameter wooden cooling tower. Here the velocity of the gases is radically reduced and they percolate slowly through a wetted wooden grill. The latter gives a final impingement surface on which a mercury particle that may have escaped the condenser system may lodge. From this tower, the gases are exhausted to the atmosphere through a 20-foot-high stack set on top of the gas washer.

To assure efficient operation with minimum reliance on the skill of the operators, the plant is completely instrumented because optimum efficiency and capacity of a mercury plant can only be obtained when correct temperatures and drafts are maintained.

Furnace Temperatures

Experience has shown that for best results a temperature of 1,375° F, should be maintained on hearth No. 6 with the gas exiting from the furnace at 630° F. This exit gas temperature is rather high when compared to typical United States practice, but is necessary because of the relatively high concentration of mercury vapors which might condense in the dust collector at a lower gas temperature. Both temperatures are continuously recorded on a Leeds & Northrup strip recorder and are available for a daily check by the supervising engineer.

Condenser Temperatures

The very important temperature of the gases leaving the condenser sys-



CRUSHED ORE is stored in this 250-ton bin, then withdrawn, as required, for treatment in the furnacing section.

treatment in the furnacing sec [World Mining Section—50] tem is shown by cased thermometers installed in the end tubes of the individual condenser banks. The maximum temperature at this point is assumed to be 115° F., but the condenser is so adequate in size that this temperature has never been reached. A manometer located in the discharge duct from the cold gas fan shows the resistance in the wash tower. Normally this resistance is about 1 inch of water column.

Educational Program

Almaden has an excellent educational program available to its employees. Classrooms are provided and instruction given weekly by the Almaden engineers in all phases of mining and associated activities. These classes are free and very well attended. They concentrate on the practical as well as the theoretical approach to mining. The apprenticeships offered in carpentry, electricity, blacksmithing, masonry, and machineshop operation are eagerly sought by the young high school graduates. These apprenticeships are for five years and stress actual work in the shops under journeyman mechanics, as well as class instruction. Higher pay rates are offered to trained men, and this, as well as an improved position in the social structure of the community, is an added incentive to the young apprentice.

Typically Spanish are the beautiful staircase and walks leading the visitor to the best vantage points from which to view the new plant. The small formal garden and fountain built in the court between the two condenser systems are beautifully kept and reflect the pride that Almaden has for

its new plant.



IBM REFERENCE STAND in mechanic's office contains tabulated maintenance data gathered from time cards and service forms.



EMPHASIS ON JOB QUALITY and good workmanship is maintained in Steep Rock's shops through installation of a preventive-maintenance program.

Preventive Maintenance Pays Off

"Service records are an important function, but they should be simple in detail."

"A preventive-maintenance program must be molded and shaped to fit one's particular equipment and reauirements."

By G. EDWARDS

Preventive maintenance is the safety program of equipment. On the one hand, we train and plan to have men perform their work in an orderly, safe way and take every precaution to see that they do not harm or injure themselves. On the other hand, surely this accident prevention can be applied in a similar manner to the prevention of equipment damage by carelessness, neglect, or improper techniques. At least, that is what has been found in actual practice at Steep Rock Iron Mines, Ltd.

Since open pit ore production first began four miles north of Atikokan, Ontario back in 1945, a system of preventive maintenance has gradually evolved.

Mr. Edwards is Master Mechanic at Steep Rock Iron Mines, Ltd.

JUNE 1955

Many of us have seen a house that has been painted without rhyme or reason. In other words, someone thought the paint looked like a nice color, so they bought it and put it on without consideration to planning, harmony or other facts.

It seems to me that in so many cases preventive maintenance programs fall down due to this same reason. They lack the basic fundamental principles of planning in the first place, like in the home painting. Management is quite often led into believing (by probably well-meaning manufacturers and others) that preventive maintenance is a simple matter of filling in a few forms and only lacks the effort of the individual to put into practice.

Why Program Necessary

In planning addition and improvements to what in 1950 was the Steep

[World Mining Section-51]

Rock system of preventive maintenance, the service personnel set out to determine overall objectives, which were the ability to:

- (1) Handle more vehicles.
- (2) Increase efficiency.
- (3) Maintain costs against increasing prices.
- (4) Gain closer control.
- (5) Break-down work detail for untrained men.

This had been necessary due to the increasing development of the mine and the demand for more service trucks, more tractors and a change-over from 15-ton trucks to 22-ton trucks. Consideration had to be given also to fitting the work program into the established buildings. The shops at that time were poorly lit, unpainted and had been designed to handle 15-ton trucks only.

Due to our isolation and manpower demands of other industry, labor was hard to obtain. While this added to the problem, it proved the need for greater control, and the setting up of procedures and practices to prolong equipment life. The next step was to seek the facts available in order to lay down procedures, and as far as possible to estimate the immeasurable factors.



TRUCK CASE HISTORY. These forms list truck service checks made at 48, 144, 300, 500, 3,000 and 5,000 hour intervals.

The company wrote to other operating mines with similar equipment; to transportation companies; and to the equipment manufacturers asking for samples of their system of control and maintenance. Manufacturers of various types of shop equipment were also sounded out for types, details and costs.

Preliminary Steps

Consultations were held with our engineering department on installation detail, our electrical department on lighting requirements, and painting engineers for advice on the value and use of color dynamics.

In conjunction with maintenance foremen, a shop layout was produced giving us the basic detail of what would take place in each bay; the estimated time cycle and the estimated men required to make the best use of the space and equipment available. Several obvious questions arose: Would it work? What would the employees reaction be to a timed and closely-controlled operation? To what extent would other departments cooperate? What would the shop supervision reaction be? To what extent would cycle lags occur?

Here was a selling job to be done in each case. The staff explained the program and reasons to all shop employees, and asked for suggestions and recommendations. It was discovered that the average man prefers things organized rather than to haphazardness, and the more so if his opinion has been asked or his idea used. Interdepartmental cooperation was received by the same method. Service personnel worked with them to keep cycle lags down to the minimum, so that production and maintenance could live in harmony. Supervisory reaction was 100 percent. It only needed the start of the program to get wholehearted effort.

Men Fitted to Jobs

Now came the time to lay out the work in relation to existing capacity and space; to work out time cycles suitable to all departments to co-ordinate the other work of our department with the program. Equipment installation, lights, painting could then be outlined along with procedure analysis of job instruction, reports and records.

The service department was now in a position to plan the work and decide how to do it by setting up estimates

- (1) Service personnel
- (2) Service Records, size, colors and detail
- (3) Clerical Personnel and Office records

[World Mining Section-52]

Service Personnel were broken down into four more groups:

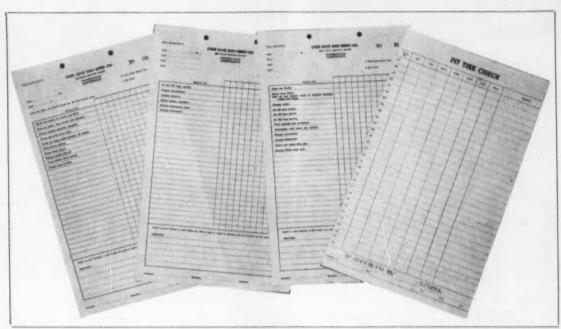
- (a) Types of men
- (b) Grades of men
- (c) Number of men
- (d) Training or experience status. Since nothing is accomplished except through the efforts of men, let's take a look at the subject of manpower. At Steep Rock every attempt is made to fit the man to the job.

Employee Training

A grade of a man is related to his status as first or second class, etc., and then in relation to the number of men that our analysis indicates is required; and lastly, training or experience status governs a man's potentiality to be up-graded. It is also in the interest of efficient operations that the more experienced man be graded and placed where this knowledge and ability would do the most good.

Instructional training was arranged on the job in conjunction with our Safety and Training Engineer and manufacturer's representatives. These were highly-organized schools with main component truck parts mounted on portable tables and wheels. They could be dismantled and re-assembled for instruction. Wide use was made of slide pictures and motion pictures. Parts books, instruction books and

MINING WORLD



TIRE RECORD, shown on extreme right, gives a complete check of all tires on every truck used by Steep Rock Iron Mines.

general engineering literature were made available through distribution in the shops and by a library set-up in the shops themselves.

A regular program of visits from servicer personnel related to the various types of equipment was set up, and on their visits to the mine, they were allowed to work and circulate freely among the men and so pass on their knowledge.

A regular program of sending a number of men to the manufacturer's plant each year was not only beneficial in a technical sense, but also the psychology of getting away from the mine for the trip gave a lift to the man and the rest of the mechanics that is worth a fortune.

Every opportunity should be given to employees to speak to manufacturer's service men. These men, generally specializing in one type of equipment, are experts, and it has been my experience that they know what they are talking about. They should be encouraged to visit your site so that their full knowledge can be put to work among your mechanics.

Keeping Records

Service records are an important function, but they should be simple in detail. Instruction should be straightforward, in good-sized print, easy to read, with writing kept to the minimum so the mechanic just has to "tick it off." Color is important so it should be made attractive and easily spotted. Size, we feel, is also important as nothing is more annoying than small pads of paper with practically no room for comments. Detail on the sheets were based on the information we had collected, on the experience and wide knowledge taken from our men and supervision.

Clerical personnel had to be adequate to handle the recorded details from various sheets and remind line supervisors of service check periods due on units. These were taken from hourly records of our operation on any particular unit. We felt this phase was important as it developed office records that gave supervision the opportunities to develop new methods and prevent hindrance to scheduling.

While it is essential not to overcomplicate office records, there is the other extreme of not having sufficient detail. Experience and forethought are still the best teachers as to what and how detailed a record should be. A concise yet simplified system will enable the clerical staff to avoid bogging down in paper work and prevent them from getting to the practical side—the nuts and bolts. It is possible to end up with the finest records in the country, and not have a truck running. On the other hand, some mechanics would have us wrap the equipment up in cellophane at the expense of production. It is quite clear that there must be a middle line.

Inventory Considerations

Materials such as spare parts, oils, grease, etc., are difficult to catalogue due to their varying weights and sizes, so considerable thought was given to safe handling and disposition of them. Also, the harmful qualities of certain oils and greases was not overlooked.

In order to ensure adequate availability of spare parts we followed a program previously set up in our stores by continuing to use a maximum and minimum system based according to the number or amount used. We found this very satisfactory if regularly revised, but if not revised it tends to leave parts on the shelf unused for an indefinite period.

Storage of oils and greases are in containers placed under the service floor and fed to the equipment by airdriven pumps. The main source of material supply is at the warehouse, practically eliminating personal contact either when filling or disposing.

With the arrival of a spare part in the stores and the issuing of it for use, the majority of people forget that it also replaces a broken or worn-out part. The handling of these parts can be, in itself, a major problem, and definitely reflects on housekeeping if not taken into consideration and attended to. Certainly nothing could be more unsafe than wornout parts piled up in the shop, and they quite often become a rust heap at the side of the shop or outside of the door.

In our case, we use five large metal containers that are spaced outside the shop. These containers have large lifting handles and are emptied regularly by use of the crane truck. This keeps the shop area clean and tidy. Salvageable parts are delivered by hand cart to the welding or machine shop for repairs.

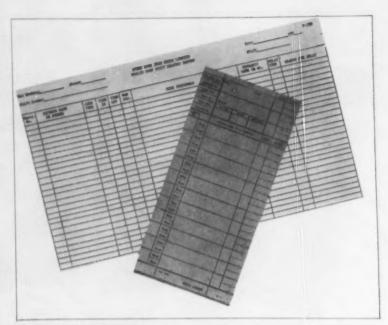
What the Program Did

As the work progressed it was found necessary to review the plan and develop new methods and procedures with changing times and equipment, and to see that personnel were: 1) working with the correct tools, 2) that our equipment was adequate, 3) the proper methods were being used. Our system is not fool-proof. For example, one review showed that our jacks were inadequate and being improperly used. We called in our safety engineer who made a study and produced a booklet on the approved uses for jacks. This simple little booklet told you the make, capacity, lift, height, the handle length, where used, how used, and general safe practice. The results of this booklet were that we continued to get the best and safest use we could out of the jacks we had until we replaced them with a more adequate type. We budgeted for more lifting tackle and precision tools according to what our firm could afford over a period of time.

Our work record indicated that we did have repeating jobs due to the wrong procedure being followed. On these a breakdown was made by recording every detail of the entire method. Examination and study of the breakdown eliminated the undesirable methods. The service department would not accept such things as a plate going to the machine shop for resurfacing and allowing the machinist to set it up improperly, or permit a mechanic to fit a plate to the truck wheel without taking off the rough edges with a file. But by the mere fact that such improper practices did show up clearly indicated that they can also be brought under control and corrected.

IBM System

Our final control check is being developed continuously by a system of



EMPLOYEE'S TIME CARD shows how many jobs each man worked on, time spent on each job and the job numbers. On the form in the background, the shift leader at the shop reports all repairs done, by whom and the time required to do the work.

records on the I.B.M. (International Business Machines) so that all loopholes will eventually be plugged. Under this system records are kept of the day, shift, truck number, operators number, pit supervision, repair shop supervision, mechanics on each repair and the repair itself. In all cases, code numbers are used.

The I.B.M. system is comparatively simple by having all mechanics on a time-clock. The card indicates his name, number, date and shift. When allocated work by his foreman, he punches the clock, goes out and does the job. He then fills in the unit number and the code for the work. This is taken from an easily-read tabulated list beside the clock. When the job is finished he punches off. His card may indicate ten jobs started and finished. and each one timed off and on. The clerical staff then take this card (used also for the employes time) and add the detail such as shift foremen, the operator for the shift, and enter it all on a single sheet ready for I.B.M. punch cards at the office.

Any desired combinations can be obtained from these cards that would show abuses, repetition, duplication, improper work, inferior parts, and so on in endless combination. For example, as soon as we have a transmission failure or axle broken we look up the history of the operator to see if it's getting to be a habit, or if we've

had full value from the part, or whether it may have been improperly installed. As one can well imagine, it isn't long before an hour-life value for each part is established.

Benefits

The benefits of a sound Preventive-Maintenance program cannot be denied:

- a) It brings law and order into what could be nothing but chaos.
- b) Where you have law and order, you have control and safety.
- Where you have safety, you have a shop operating on sound, modern methods.

The evolution of the program did not take place in a day, but rather basic principles were laid out and followed. Each year equipment is budgeted for or bought to round out the total program.

As time progresses it has been found that some of the program has grown stale; that men get tired of doing the same old thing; so that phase of the program is taken out. A sheet or color is changed. A form is re-worded to give the same old thing new life. That is just what happens in most programs, whether it be a safety or a maintenance program. To keep it alive, to keep men alert, we can't afford to stand still.



STOCK ISSUES and financing questions occupied the time of the security and stocks panel. Left to right are: Walter Gutman, securities analyist; Curtis White, director, Colorado Securities Com.; George Griese, attorney, Securities and Exchange Com.; E. H. Saunders, Four Corners Uranium Company, moderator.



MEMBERS of uranium activities panel are: (left to right) Miles Romney, manager, Utah Mining Association; Dr. Tom Nolan, acting director of USGS; Clyde Boyle, Sodak Mining Company; Vance Thornburg, Grand Junction; Irving Rapaport, Grants, New Mexico and Jack O. Jones, Grand Junction, who presided.

Small Operators Air Their Problems At Second Annual UOPA Convention

Behind the window dressing of parades, choosing of Miss Atomic Energy, luncheons, banquets, helicopter flight demonstrations, and showing of mining supplies and machinery at the second annual Uranium Ore Producers Association exposition held in Grand Junction May 6, 7, and 8, were the serious matters of concern to every miner on the Colorado Plateau.

What about large royalties being charged by some states on school land leases? What is going to be the eventuality on public acceptance of uranium stocks? Will stocks become known as "sucker bait" as they were in the gold rush days of another era? How long will it be before the independent producers are out of the uranium picture? Are better state laws past due on claim filing and protection to first locaters? Are improved radiation detection instruments coming to keep pace with the industry? Will new methods be used to recover ore from deep deposits unknown today? Will government get out of the exploration field? Why has the government contracted for foreign purchases of uranium up to 1966 while domestic producers have no assurance of a market beyond

These and many more questions

were propounded by speakers and mine operators during the sessions of May 7. Some were answered. Many were left dangling as a problem to be solved in the future.

Royalties Too High?

Miles P. Romney, manager of the Utah Mining Association, pointed to the 12% percent royalty required by the state of Utah on leases as a deterring factor to profitable operation on the average mine in that state. He suggested that all states revise royalty and other mining laws for a more realistic and sympathetic approach in the Uranium Age.

Mr. Romney revealed statistics on mergers of uranium firms in Utah. He said that since June 22, 1954, there have been 46 companies merged into 13, although there are still several hundred operating in that state.

The problem of claim jumping and protection of "one's prospecting rights in a reasonable area of ground while searching for a discovery" was discussed at length by Mr. Romney. He said, "Much potential uranium mineralization lies under several hundred feet of overlying, barren formations. Many potential lead-zinc, copper, iron, and other locatable minerals lie

under areas of desert wash, lava flows or deep soil cover."

The mining association manager then asked, "Is it not practical to consider a law permitting the prospector, large or small, to reserve a reasonable amount of ground for prospecting during a reasonable period?

On Mergers . . .

Lieutenant Governor Stephen L. R. McNichols of Colorado, counsel for U.O.P.A., told a business session that unless the small miners get behind programs and legislation which will improve the operating climate "within two years you will be able to count the independent producers on your two hands." Mr. McNichols said he made this prediction because "I went through the vanadium industry deal and saw the small operators disappear."

Mr. McNichols suggested a "lottery leasing" plan to be established by the U. S. Atomic Energy Commission which would give all financial and morally responsible operators an opportunity to share in the government leases. The lieutenant-governor called to mind instances where large companies had obtained leases and then sub-leased them to operators who had to pay 50 to 60 percent of profits to the nonoperating company.

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State and Federal Laws

A cure for confusion resulting from the new Colorado law which permits a prospector to file a plat of a claim "at his option" rather than digging a discovery cut as required under the old law, was suggested by Norman Ebbley, a director of the U.O.P.A. He said the phrase "at his option" should be stricken from the law. Under present conditions prospectors filing a prior claim with an indefinite legal description or who failed to complete state or federal discovery work could come in and contest a plat that had been filed, according to Mr. Ebbley, contending his discovery cut or assessment work had been bulldozed over by the later claim filer. Some filing under the old discovery cut method and some under the plat system has added more turmoil to the situation, Mr. Ebbley said.

A few individual mine operators were fearful of proposed legislation before Congress which is designed to eliminate phony claim filings on forests. They voiced fear that the forest service might secure a tighter hold on legitimate mining operations, but this was dispelled somewhat by Lt. Gov. McNichols who said the American Mining Congress is backing the measure which appears likely to pass at this session of Congress.

DMEA Assistance

Increased assistance to uranium miners through the Defense Minerals Exploration Administration was promised by C. O. Mittendorf, administra-

tor for the federal agency.
Mr. Mittendorf said, "DMEA can take little credit for uranium development up to now . . . only 28 percent of DMEA funds have gone to uranium exploration.

He added that during the first two years only five percent of applications were from the uranium industry but

now a backlog has piled up.
"Since DMEA does not advance public funds for prospecting and grubstaking as those terms are commonly understood," said Mr. Mittendorf, "it could only be helpful in specific cases where the initial prospecting had been accomplished." He attributed the low rate of applications initially to the fact that the industry up to a short time ago was "very much of an infant."

Processing Facilities

Answering the complaints of some uranium mine operators over a lack of processing facilities in some areas, Shelton P. Wimpfen, manager of the Grand Junction AEC operations office. said, "Mill facilities in operation today are processing ore at a rate more than three times greater than the 1952 rate of processing. This will climb to a rate of about five times greater than the 1952 rate when we include mill construction now under way and the agreements reached for other expanded facilities-all of which are expected to be completed by the end of this calendar year or early in 1956. Actually, comparison of the average tons per day of ore processed in 1952 with the average tons per day to be processed when the current expansion plans are completed, reveals a 465 percent increase in processing facilities in a little over two years."

Stocks and Promotion

Confidence in uranium mining stocks is being shaken by "what has taken place within the past year in this sometimes frenzied financing of uranium companies." That was the statement of Curtis White, Colorado director of securities, during an afternoon panel discussion. Mr. White said. "To begin with, I have been dismayed that so many persons in the securities industry have reverted to the ideas and practices of a generation ago which brought the gold mining industry into disrepute and which resulted in a share of gold mining stock being considered a symbol of fraud and which also resulted in the entire mining industry being looked upon with distrust and suspicion by many people."

Mr. White said that not all persons engaged in the securities business have succumbed to the get-rich-quick idea on sale of uranium stocks.

He added, "From a public official's point of view, I think it is to be regretted that in the promotion of many uranium mining companies excessive sales commissions and selling costs have been incurred (which, of course, are paid out of investors' dollars), that underwriters and other insiders have been allowed to purchase shares for a nominal consideration while the public is asked to buy at an inflated price, that underwriters have demanded stock bonuses and stock options as an additional price for their services, that the shares sold for cash are in the minority, and that in the final analysis investors assume the entire financial risk while sharing in less than half of any profits that might

later accrue."
Solution? Said Mr. White, "If I should be asked to make one single suggestion as to how the situation with respect to uranium financing could be improved, my answer would be that there should be a greater degree of dealer responsibility in the origination and financing of these companies and that the securities industry should take measures to clean its own house and live up to its

public responsibility."

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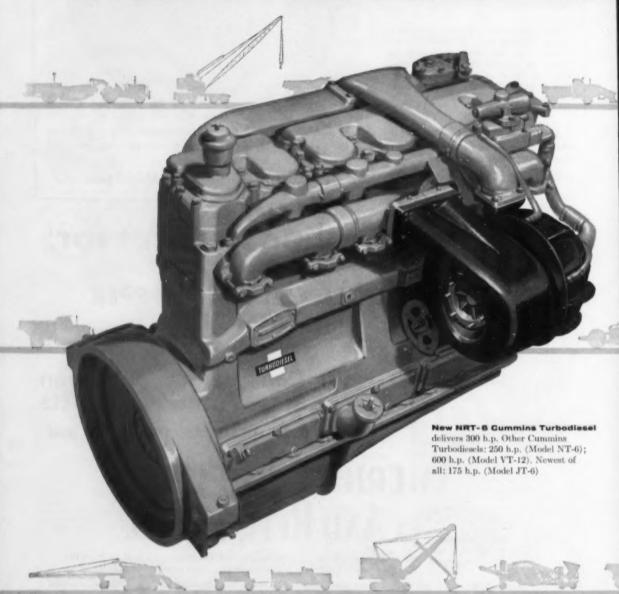
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United States

Personalities in the News-

C. HYDE LEWIS has been named president of the New Idria Mining and Chemics! Company, Idria, California. A veteran of 33 years in the mining industry, Mr. Lewis joined New Idria in 1936 and subsequently was named general



president of the company. He began his mining career with the Phelps Dodge Corporation and later worked for H. W. Gould & Company and the Getchell Mining Company. He is a member of the American Institute of Mining and Metallurgical Engineers.

Daniel Geary was named mine superintendent for the National Lead Company, St. Louis Smelting Refining division and took over his duties at the Ballard mine near Baxter Springs, Kansas in April. Mr. Geary succeeds Don Waltman, who was transferred to the Edwards mine in New York.

J. H. Andrews, Jr., electrical engineer, and Arthur L. Bailey, mining engineer, have joined the staff of International Minerals & Chemical Corporation, Florida Phosphate Minerals division.

William L. Walsh has been appointed assistant to the president, Kennecott Copper Corporation. With headquarters in New York City, Mr. Walsh's duties will be mainly in the field of Kennecott's titanium interests.

H. I. Altshuler, consulting mining engineer, has been named director and vice president of the New York and Honduras Rosario Mining Company. Also named vice president for the firm was David L. Moore, chief geologist.

G. R. Whittington, veteran of 50 years' service with Cleveland-Cliffs Iron Company, has retired. His most recent position was that of safety supervisor for the Minnesota division.

John Sherwin is the new senior partner at Pickands Mather & Co. at Cleveland, Ohio, succeeding the late Elton Hoyt, II. Mr. Sherwin also assumes the presidency of Interlake Steamship Company, which is managed by Pickands Mather.

Russell Tyree, general superintendent for Vitro Minerals Corporation in Wyoming, has resigned to enter private business.

Louis Koenig, associate director of Southwest Research Institute, has been appointed vice president of the San Antonio, Texas group. Formerly with the United States Atomic Energy Commission, Dr. Koenig will direct the institute's expanded chemistry, chemical engineering, minerals, metals, and high energy divisions.

Nigh energy divisions.

Victor E. Kral, former associate professor at the Mackay School of Mines, Reno, Nevada, is serving as acting resident manager for Ford Motor Company's Northern Mining Properties. Located at Iron Mountain, Michigan, the mine produces iron ore for the Ford company.

Andrew Fletcher, president of the St. Joseph Lead Company of New York, was elected president of the Lead Industries Association at its annual meeting in Chicago, Illinois. He succeeds J. B. Haffner, former president of the Bunker Hill & Sullivan Mining and Concentrating Company, Kellogg, Idaho. Elected as vice presidents were K. C. Brownell, president American Smelting & Refining Company; J. A. Martino, president, National Lead Company; M. M. Zoller, vice president, The Eagle-Picher Company.

Austin Dunn has been reappointed as a member of the governing board of Oregon's Department of Geology and Mineral Industry. A former State Senator, he was originally appointed last August.

Norman L. Deuble, Climax Molybdenum Company, has been named manager of the newly created metallurgical development division. The division will develop and disseminate technical information on the use of molybdenum alloy steels in various industries, including mining. Mr. Deuble is considered an authority on the development of metallic molybdenum produced by the arc-casting process and has had close to 25 years experience in the industry.

F. S. Mulock, president of the United States Smelting, Refining & Mining Company, is the new president of the American Zinc Institute. Also elected at the institute's annual meeting in Chicago, Illinois were the following vice presidents: C. Merrill Chapin, Jr., St. Joseph Lead Company; R. G. Kenly, The New Jersey Zinc



WILLIAM J. OWEN, president of Meab Mines, Inc., and ROBERT R. NORMAN, study Geiger counter readings from a uranium ore sample taken from their mine in the Uravan Mineral Belt on the Colorada Plateau. The two Texas geologists recently formed their uranium corporation, which has been granted a charter by the state of Utah. Mr. Owen is a former geologist for Hunt Oil Company, and Mr. Norman also has an oil background, having worked for the Delhi Oil Cerperation, National Geological Company, Shell Oil Company, and Arabian-American Oil. Heldings of Moab Mines, covering 5,700 acres, are situated in Grand and San Juan counties of southeastern Utah.

JOHN H. WHITE, JR., former president of Climax Molybdenum Company of Pennsylvania, has accepted the presidency of Uranium Corporation of America. The vacancy was created by the resignation of RAMON N. BOW-MAN, who will continue the serve as fi-



nancial consultant. Mr. White has served major corporations for nearly 30 years as an
executive in mining and refining of metallic
eres. He is currently a milling consultant to
Standard Ore and Alleys Corporation, which
recently signed an agreement with UCOA to
do drilling and exploration work on properties of the uranium firm in Arizone. Mr. White
is also a past president of Climax Uranium
Company, large Colorade Pleteau uranium
producer and processor.

Sales Company; E. H. Snyder, Combined Metals Reduction Company.

The following promotions have been announced by the Nevada Mines Division of Kennecott Copper Corporation: William M. Mansfield, promoted from chief engineer, power plant, to assistant mechanical-electrical superintendent; Theo L. Anderson, from master mechanic to mechanical superintendent, mining department; Scott L. Burrill, from acting mill general foreman to mill general foreman; George L. O'Boyle, from machine shop foreman to mechanical department general foreman.

Two recent additions to Potash Company of America's Carlabad, New Mexico engineering department are William F. Baumann and Larry Weddle. Mr. Baumann was formerly employed by United States Gypsum Company in Texas. Mr. Weddle's last position was with the Colorado Fuel & Iron Corporation.

R. Worth Vaughan was named executive vice president and Oscar S. Strauss vice president and treasurer at a recent board meeting of the American Smelting and Refining Company in New York City. Mr. Vaughan is general counsel for the corporation and has been vice president since 1947. Mr. Strauss, who is also director of General Cable Corporation and Revere Copper and Brass, Inc., joined the company in 1946 as assistant to the treasurer.

William J. Harris, Battelle Institute, Columbus, Ohio, has been named assistant to the director and will make his headquarters at the institute's office in Washington, D. C. He will work with government organizations that sponsor research in the Battelle laboratories.

A. Clifford Melting has been named vice president of Western Mines, Inc., subsidiary of Western Development Company, Santa Fe, New Mexico. Mr. Melting was formerly concentration plant superintendent for Lone Star Steel Company and has been mill superintendent for St. Louis Smelting & Refining Company.

William A. Seedorff, International Minerals & Chemical Corporation, has been promoted to project engineer at the Carlabad, New Mexico plant.

Raymond C. Toothman has joined the Carlsbad operation as mine maintenance supervisor. He was formerly with the Bethlehem Mining Corpora-tion, Barrackville, West Virginia.

William Moses was named main-tenance foreman recently at M. A. Hanna Company's Wauseca mine in Michigan.

Matthew R. Banovetz is now super-Matthew K. Banovetz is now super-intendent of pelletizing at Reserve Mining Company's Babbitt plant, Babbitt, Minnesota. He joined the company in 1951 as an accounting clerk, was advanced to furnace tender, and promoted to foreman in 1953.

Richard I. Whelan has been named vice president of Youngstown Steel Products Company of California.

Harry M. Brindle, formerly assistant chief engineer for Consolidated Coppermines Corporation, has been advanced to chief engineer. He succeeds Harold W. Bishop, who has resigned. Woodward J. Latvala, formerly an assistant professor of mining en-gineering at New Mexico School of Mines, replaces Mr. Brindle as assistant chief engineer.

Charles B. Sanborn has joined the electroplating section of the Develop-ment and Research division, The Inter-national Nickel Company, Inc., New York. The section is concerned with the technical aspects of the applica-tions and uses of nickel coatings.

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FUGENE D GARD. NER, holder of the Jackling Award of the AIME and the Distinguished Service Award and Gold Medal of the United States Department of the Interior, has retired as chief mining engineer of the U.S. Bureau of Mines after nearly 44 years



of government service. His studies of blasting and drilling techniques have contributed substantially to the efficiency of today's metal mines, and he was instrumental in developing the Bureau's ell-shale plant at Rifle, Colorado. He will continue to serve the bureau in a consulting capacity.

J. T. Lewis, Jr., United States Smelting, Refining & Mining Com-pany, has left his assignment at Bayard, New Mexico to take up new duties in Salt Lake City, Utah.

R. H. Allport, district supervisor for the United States Geological Survey the United States Geological Survey in Carlsbad, New Mexico, retired after 45 years in the mining industry, 32 of them with the USGS. Before joining government service, Mr. Allport held mining positions with firms in Mexico, Virginia, Pennsylvania, Ohio, Peru, and Montana.

C. L. Kingsbury, Jr., Reserve Mining Company, was appointed superintendent of crushing and concentrating operations at the firm's Babbitt taconite plant in Babbitt, Minnesota.

Donald D. Smith, Central Eureka Corporation, was elected president and chairman of the board. He succeeds H. J. McPherson, who continues as a member of the board of the directors.

Jack W. Reinhart, geologist, was named manager of geology and quarry operations, Perlite and Dicalite divisions, Great Lakes Carbon Corporation, Los Angeles, California. Mr. Reinhart has been engaged by the company since 1953 and in 1954 was named chief geologist.

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1915-PIONEERS HAULAGE EQUIPMENT

OBITUARIES

Harvey S. Mudd, 66, president of Cyprus Mines Corporation and director of numerous other mining companies, died April 12 in Beverly Hills, California. A former president of the American Institute of Mining and Metallurgical Engineers, Mr. Mudd was assistant secretary of the War Minerals Committee during World War I and a former engineer for the United States Bureau of Mines. His mining interests included the Texas Gulf Sulphur Company, Mesabi Iron Company, and the Southern Pacific Company, and the Southern Pacific Company.

W. A. Roberts, 57, president of Allis-Chalmers Manufacturing Com-pany since February 1951, died April 12 in Milwaukee, Wisconsin. He began his career with Allis-Chalmers in 1924 as a tractor salesman, later serving as Canadian sales representative, and coming to the Milwaukee headquarters in 1930.

Nathaniel T. Davis, president of Silver Star-Queens Mines, Bellevue, Idaho, and Max E. Krueger, vice presi-dent, were killed March 31 in a traffic accident near Shoshone, Idaho.

Newsmakers

in International Mining

ROY H. GLOVER, vice president and general counsel of the Anacconda Copper Mining Company, received the Order of Marit from Carlos Ibanes, president of the republic of Chile, in a ceremony at Santiago, Chile in April. One of the highest hom-



ors bestowed by the Chilean government, the order was awarded to Mr. Glover for his contribution to the country in connection with Chile's copper Industry. Mr. Glover maintains headquarters in Butte, Montana, but has made frequent trips to Chile for Anaconde's copper program there.

The following officers and directors have been named by the Mindanao Mother Lode Mines, Philippine Islands, to serve for the coming year: Dr. Manuel Lim, chairman and director; T. M. Jordan, president and director; Henry A. Brimo, vice president and director; James E. Norton, vice president and director; James E. Fairweather, treasurer; R. O. Ferguson, assistant treasurer; J. C. Pineda, secretary; and Jose Tiong Sin Ben, Milton H. Pickup, and C. E. Olsen, directors.

David M. Harris has been elected president of New Kelore Mines Limited, Toronto, Ontario, Canada. Mr. Harris resides in Scarsdale, New York.

D. J. Simpson, formerly senior geologist with the South African Atomic Energy Board, is now working as a consultant in Johannesburg, Union of South Africa.

J. B. Haffner, who recently retired as president of Bunker Hill & Sullivan Mining and Concentrating Company, Kellogg, Idaho, is touring Sweden and western Europe. This is the 50th anniversary of his graduation from the University of Stockholm as a mining engineer. He was succeeded at Bunker Hill by John D. Bradley, executive vice president, who has head-quarters in San Francisco, California.

Ed Matsen, general mine foreman for Climax Molybdenum Company since August 1, 1954, resigned to accept employment with Marsman and Company in the Philippine Islands.

FRANK C. PICKARD, head of the mining division of the Gregg Car Company, Lid., left Brussels, Belgium late in April for an extended trip through Africa. He has been visiting mines in Nigeria, the Gold Coest, Angela, Belgian Congo, Rhodesia. South



Africa, and East Africa. He is supervising the final erection of the Gregg 50-ton air dump cars for the new open-pit operation at Nchanga. He expects to return to Brussels in August. He was first employed by Climax in 1929 and from 1947 to 1950 served as tunnel engineer on the Big Thompson project for the United States Bureau of Reclamation.

J. W. Foote, formerly with the Zinc Corporation Limited, Broken Hill, New South Wales, Australia, is now employed by Mount Isa Mines Limited, Queensland, Australia.

Folke H. Kihlstedt, who was in charge of Oliver Iron Mining Division's exploration in Venezuela in 1947 which led to the discovery of the Cerro Bolivar iron deposit, has been appointed consulting mining engineer for that division of United States Steel Corporation. For many years he was affiliated with the Swedish Diamond Drilling Company and before World War II was general superintendent of the Philippine Iron Mines, Inc.

Julian B. Beaty, previously president of Granby Consolidated Mining, Smelting and Power Company, Ltd., has been made chairman of the board. Lawrence T. Postle, formerly vice president and general manager, was elected president. New general manager is J. A. Ross, formerly general superintendent at Copper Mountain, British Columbia.

In attendance at the recent Institute on Lake Superior Geology, which was held in Minneapolis, Minnesota, were J. M. Harrison, Geological Survey of Canada, Ottawa, Canada, and J. V. N. Dorr, United States Geological Survey, Bello Horizonta, Brazil. Dr. Dorr has been working with the Brazilian government for the past few years in the Minas Gerais iron ore district of Brazil.

An eight-man British steel mission arrived in New Delhi, India in April to discuss with the Indian government the construction of a steel plant in that country. Led by Sir Eric Coates, the mission includes Dr. T. P. Colclough, chief technical adviser on development to the British Iron and Steel Federation; D. Barritt, director of the Coke Oven Department, Simon-Carves Ltd.; H. Staymen, general manager and chief engineer, McKee Iron and Steel division, Head, Wrightson & Company, Ltd.; W. W. Franklin, Steel Works Plant Association; G. N. Hewett, McLellan & Partners; V. G. Burley, export manager, Wellman Smith Owen Engineering Corporation, Ltd.; W. D. J. Brisby, British Iron and Steel Research Association. Mr. Brisby is technical secretary for the group.

Ronald J. Morton, manager of research, Oliver Iron Mining Division, United States Steel Corporation, has returned to Duluth, Minnesota from a trip to England, France, Germany, and Sweden.

Arthur G. Metcalfe, research metallurgist, has been promoted to senior metallurgist, highest professional position at Armour Research Foundation of Illinois Institute of Technology, Chicago, Illinois. Dr. Metcalfe was research metallurgist at the Delaro Smelting and Refining Company, Ontario, Canada, before coming to Chi-

E. E. GROFF, formerly assistant smelter suparintendent at Hayden, Arizona, has been transferred to American Smelting & Refining Company's operations in Mr. Isa, Queensland, Australia. He will serve in the capacity of general superin-



Queensiand. Mr. Groff was chemist and metallurgist at ASARCO's Garfield, Utch operation for 10 years before going to Hayden.

cago in 1953. From 1942-46 he was a metallurgist at the Hard Metal Tools Company, Coventry, England.

James G. Campbell succeeds H. Vance Echols as managing director of the Demerara Bauxite Company Limited, Georgetown, British Guiana. Mr. Echols has been transferred to an executive position with the parent firm, Aluminium Limited, Montreal, Canada.

Arriving in Peru during March were a group of officials from United States mining companies with interests in the Southern Peru Copper Corporation, which has been formed to develop the Toquepala, Quellaveco and Cuajone copper deposits. Among the visitors were Roger W. Straus, chairman, American Smelting & Refining Company; Kenneth C. Brownell, president, AS&R; Richard F. Goodwin, vice president in charge of mines, AS&R; Robert G. Page, president. Phelps Dodge Corporation; Plato Malozemoff, president, Newmont Mining Corporation; Robert P. Koenig, president, Cerro de Pasco Corporation.

Harold Heide, assistant general superintendent of the Surigao Consolidated Mines, has returned to the Philippine Islands from the United States.

H. I. Altshuler is serving as consulting engineer to St. John d'el Rey Mining Company Limited in Brazil. He is not chief engineer for the firm as was erroneously reported in last month's column.

BYRON E. GRANT, mining consultant of Salt Lake City, Uteh, hes been appointed assistant general manager of the Braden Copper Company, Chile. The company, a subsidiary of Kennecott Copper Corperation, is one of the largest copper producers in South



America and maintains operations in the Sewell-Rancague area of Chile. Mr. Grant previously was employed by the United States Smelting, Refining and Mining Company for 18 years. During this time he rose to the position of assistant to the vice president and general manager of wastern operations. He resigned this post late in 1954 to enter private practice as a uranium mining consultant. He assumed his new position with Braden early this month.

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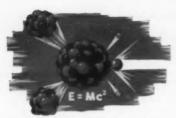
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Portuguese AEC Sets Up 2-Year Survey Program

Uranium surveying and prospecting in an area south of the Douro River is being planned by the Portuguese Government Atomic Energy Commission. Covering an area of 12,000 square kilometers, the surwill include scintillation flights, ground geological surveys, and Geiger counter surveys.

The first stage of operations is planned to last two years and will include sur-veying, photogeologic interpretations, diamond drilling, and shaft sinking. Prospecting is expected to begin first in the Beira area.

Oil Companies Report **More Uranium Activity**

Several new oil companies were noted on the uranium scene during April and May, continuing the trend that became noticeable during the latter part of last year. Sun Oil Company has announced that it will begin uranium exploration in the Rocky Mountain area, probably un-der the supervision of its subsidiary, Corder the supervision of its subsidiary, Cor-dero Mining Company, California mer-cury producer. Sun Oil also recently signed an agreement with Southern Min-erals Corporation, entitling Southern Minerals to exclusive rights to prospect for uranium on leases held by Sun in southwestern Texas. Seaboard Oil Com-pany also granted rights to Southern Min-erals for uranium exploration in Texas. erals for uranium exploration in Texas.

Meanwhile, Wildcat Uranium Corpo-

Meanwhile, Wildeat Uranium Corporation, Kansas oil producer, has purchased all the assets of San Miguel Uranium Mines, Inc., including a 50 percent interest in 81 claims in the Paradox mining district, San Miguel County, Colorado. The other 50 percent is held by World Uranium Corporation. Ore is being shipped daily from two producing mines on the claims.

on the claims.

Recently filing papers of incorporation in Colorado were: Homestead Oil & Uranium Company, King Uranium Gas & Oil Company, and Lost Creek Oil and Uranium Company.

\$5,000,000 in Bonuses **Paid to Uranium Miners**

More than \$5,000,000 has been paid to uranium miners in bonus payments by the Uuited States Atomic Energy Com-mission since March 1951. The bonuses are paid on the first 10,000 pounds of certified U₂O₂ produced from new mining properties and as of April 7, 1955 amounted to \$5,001,019.

amounted to \$5,001,019.

Awards amount to double the base price paid for the U₂O₃, and the 2,889 payments have been made to a total of 538 properties. Ninety-one of these properties have received the full benefits, which range from \$15,000 to \$35,000 for one 10,000-pound lot.

FISSION FACTS

Monthly Roundup of Mining News In the Atomic Energy Field

Uranium Readings

Uranium miners and prospectors have an understandably difficult time keeping up with the great supply of reference material now being produced by various government agencies, mining associations, and private com-panies. As a service to the industry, MINING WORLD has compiled the following roundup of information on current maps, guides, and books now available to the United States uranium industry.

MAPS. The United States Atomic Energy Commission has made its Airborne Anomaly Location Maps available to all who wish to subscribe to the series. Previously, these maps were posted for inspection only at certain public locations. Now the entire series will be mailed each month to subscribers at \$8.00 per year or \$14.00, if sent by airmail. No individual maps will be sold. The entire series may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

Several other maps of use to uranium miners are:
A tectonic map of the Colorado

Plateau, showing uranium deposits, by Vincent C. Kelley, University of New Mexico. Prepared in cooperation with the AEC, the five-color map locates 71 known deposits of uranium. The 26by 32-inch sheet has a scale of 1-inch to 16 miles. It may be obtained from the Editor of Publications, University of New Mexico, Albuquerque, New Mexico, for \$1.00. New United States Geological Sur-

vey map, showing uranium, vanadium and copper deposits in the Four Corners area. It may be purchased by mail from the Geological Survey Map Distribution Section, Washington 25,

D.C., for 50 cents.

REGIONAL HANDBOOKS. Some of the most recent handbooks pertaining

to specific areas are: Colorado Plateau: "Regional Tectonics of the Colorado Plateau and Relationship to the Origin and Distribution of Uranium," Editor of Publications, University of New Mexico, Albuquerque, New Mexico, for \$2.00. Montana: "Practical Guide for Pros-

pectors and Small Mine Owners in Montana, by Koehler S. Stout, chief of the mining division, Montana Bureau of Mines and Geology, Butte,

Montana New Mexico: "Uranium in New Mexico", issued by the New Mexico Mining Association and the New Mexico Bureau of Mines and Mineral Resources. This pamphlet includes descriptions of uranium-bearing forma-tions, a map showing occurrences, a copy of the AEC ore price schedule, laws relating to the filing of claims, and general hints to prospectors. It may be secured, free of charge, from the New Mexico Mining Association, Box 1125, Santa Fe, New Mexico. Washington: "Notes to Uranium Pros-pectors" lists places in the state of Washington: Notes to Cranium Pros-pectors' lists places in the state of Washington where radioactivity has been detected, describes rocks in which uranium ore is found, and gives instructions to the prospector. The bulletin may be secured from the Washington State Division of Mines and Geology, Olympia, Washington.

HANDBOOKS FOR THE PROS-PECTOR. "Uranium, Where It Is and How to Find It," by Proctor-Hyatt-Bullock, is a book designed for the beginning prospector, especially on the Colorado Plateau. It may be pur-chased from Eagle Rock Publishers, Box 1581, Salt Lake City, Utah, for

Several of the most current government handbooks available are:

"Information in Regard to Mining Claims on the Public Domain", Cir-cular 1278, Bureau of Land Manage-ment, Washington 25, D.C., free of charge

"Lode and Placer Mining Regulations", Bureau of Land Management,

Washington 25, D.C.

"Portable Scintillation Counters for Geologic Use", Circular 353, United States Geological Survey, Washington

States Geological Survey, Washington 25, D.C.

"Prospecting for Uranium with CarMounted Equipment," Bulletin 988-I,
United States Geological Survey,
Washington 25, D.C., 15 cents.

"Prospecting with a Counter",
United States Atomic Energy Commission, Washington 25, D.C., 30 cents.

GENERAL REFERENCE WORKS. "Minerals for Atomic Energy", by Robert D. Nininger, deputy assistant director for exploration, United States Atomic Energy Commission. highly recommended general text is published by Van Nostrand, 250 4th Avenue, New York 3, New York, for

"Glossary of Uranium and Thorium-bearing Minerals", Catalog No. 1 19.3:1009-F, Superintendent of Docu-

ments, Covernment Printing Office, Washington 25, D.C.
"Selected Readings on Atomic Energy," U.S. Atomic Energy Commission, Washington 25, D.C., 15 cents.

INFORMATION DEPOSITORIES. In addition to the materials men-tioned above, unclassified information may be obtained at the three national depositories of information in the field of Atomic Energy which was set up by the AEC last year. They are: Stan-ford Research Institute, Stanford, California; The Atomic Industrial Forum, New York City; John Crerer Library, Chicago, Illinois

Philippine Islands Finds New Mining District In Development of Palawan Quicksilver Deposits

Prospecting and development at Palawan Quicksilver Mines, Inc. in the Philippine Islands has already proven so successful that a new mining district for the Islands is assured and a major quicksilver district of world importance may soon become a reality.

Soon become a reality.

So successful has this prospecting been that plans are being considered to double furnace capacity even before the first 80-ton Gould rotary kiln arrives in the Islands from San Francisco, California.

Exploration by test pitting, diamond drilling, and driving a series of short adits in the original Tagburras discovery area has proven 90,000 tons of 8.5 pound ore. Much of this can be easily mined by open pitting. More than 800 test pits on 20-meter centers have been sunk. These are to depths of 20-meters and bedrock has not been reached in many. Twenty diamond drill holes, some to 60-foot depths, have also been finished. From this exploration more than 1,500 samples have been cut and assayed. Final depth of ore has not been determined but the adits now being driven will give a clue to structure, grade, and depth. It is safe to say that substantially more tonnage will be developed in the area as many pits were bottomed in ore and the drill holes showed mineralization in depth. However, because of poor core recovery and open cracks, accurate grade determination of many structures has been impossible. Drilling gave a structural clue now being checked by adits.

It was in 1937 that George Newman, now vice president of Marsman & Company and general manager of Palawan Quicksilver, recognized cinnabar in a road cut in Tagburos Barrio, some 14 kilometers north of the city of Puerto Princesa. He was prospecting for gold and thought nothing of the cinnabar. In 1953 he was again in the area and because of the high price for mercury decided to recheck his mercury discovery. By careful prospecting and stream panning in the heavy tropical rain forest, he was able to locate botryoidal cinnabar on outcrops.

In general the geology and country rock is very similar to that of the California Coast Range. Serpentines are plentiful. The cinnabar is found in many places in fractures and shears with quartz and calcite. The original discovery area shows blebs, films, and disseminations in opal, and quartz. This type of mineralization is very similar to the opalite mercury deposits of northern Nevada, southeastern Oregon, and southwestern Idaho.

A %-yard Buckeye shovel will be used in the open pit, which originally will be the mining of the top of a low ridge, or a 15- to 20-foot-thick layer of ore. The pit is planned so that six or seven faces of ore will be exposed. During the wet season, the ore will be mixed with that mined underground to assure a suitable furnace feed. No trouble is expected in operating the pit in the rainy season as the area drains well. The surface material will get wet but is relatively gritty because of high silica content and does not make mud.

In the open pit area 20 percent of the volume is hard boulders. It will be possible to determine by visual inspection if boulders are ore or waste. The opalite ore-bearing structure and partially silicified serpentine will be furnaced and the

hard barren jasper sorted out.

The Gould kiln, condensor system, and dust collector has been designed with a 20 percent greater capacity than a regular plant to take care of the water content and fineness of the ore. A 40-pipe condensor will be used with an 11-inch dust collector. Three redwood tanks will be used instead of the regular two. Everything is new excepting the kiln shell. Six months of spare parts and 30 percent surplus bricks have been purchased. The unit has a soot hoeing machine and a flasking machine. The kiln will be heated by burning industrial Diesel fuel. The same fuel will be used in power plant and shovel so one fuel will be used for everything. A storage terminal is under construction in the Puerta Princesa port area.

Fortunately the mercury will be easy to sell. In fact more than 20 buyers have offered to take part or all of the production. Best offer has been received from Japan. The mercury has been assayed and contains 99.994 percent Hg with As, and Sb Nil; and a very small percentage of Fe, Ca, and Ag.

Prospecting has continued in the area and three kilometers away cinnabar has been found in stringers in metamorphic schistose argillite. Test pitting is under way and high grade stringers to %-inch thick of cinnabar have been found.

Sluicing of creeks to recover placer cinnabar is under consideration. It is believed that natives can recover enough to pay for the cost of exploration.

Bolivia Acts To Spur Tin Mine Production

The Bolivian government has instructed the Corporacion Minera de Bolivia to work out incentive plans for increasing mineral production in the nationalized tin mines, and has authorized the Bolivian Mining Bank to increase by 120 to 160 percent prices for output of privately owned small- and medium-sized mines.

Plans for increasing the production of nationalized mines are to be formulated by a new commission, made up of representatives of interested government agencies and the COB labor organization (Central Labor Organization of Bolivia) and replacing a similar former commission

Mines and mine operators are to receive a bonus of 80 percent in dollars for any surplus they may produce above their average output in the years 1952 to 1954, the remaining 20 percent to be paid in bolivianos. This dollar bonus may be freely disposed of or used for import of specified items.

be freely disposed of or used for import of specified items.

Medium-size mines are guaranteed 16 percent of the gross value of their output in dollars, which, like the bonus payment, is to be used for importing essential equipment. This foreign-exchange authorization will revert to the Banco Central if not used within 180

Medium-size mine operators also are authorized to conduct their own export sales negotiations, if by so doing they can obtain better prices than the Mining Bank can, although the contract will be signed by the latter institution as heretofore.

Export sales of the small-mine operators will continue to be managed by the Mining Bank, as will all equipment imports. Special dollar accounts, however, will be opened for each small-mine operator equal to 16 percent of the gross value of his sales, to assure that he receives his full share of his dollar earning.

Newmont In Joint Turkish Mining Venture

The Newmont Mining Corporation will undertake a joint mining venture in Turkey with the Etibank, owned by the Turkish government. Newmont will form and finance a Turkish subsidiary which will have two-thirds interest in the joint venture and the Etibank will have one-third.

Newmont has been interested in certain mining properties in Turkey since 1928 when company engineers made preliminary examinations, but the attitude of the Turkish government has not been considered favorable to foreign investment. Recently new investment and mining laws have been passed, designed to encourage development of Turkish deposits by foreign capital, and this has led to renewed interest by Newmont.

Pacific Tin To Mine Near Kuala Lumpur, Malaya

Pacific Tin Consolidated Corporation of New York expects to begin tin mining operations by the end of the year on a new site only three miles from the center of Kuala Lumpur. Malaya.

of Kuala Lumpur, Malaya.

A dredge is currently being dismantled in Mampar, moved to Kuala Lumpur, and then reassembled on the site near Old Pudu Hill. The transfer may take ten months to complete.

Atlas Starts 100,000th Ton Ore Through Mill

Atlas Consolidated Mining and Development Corporation started milling its second 100,000th ton of ore late in April at its 4,000-ton-per-day flotation plant on Cebu Island, Philippines. First ore was milled on February 23rd and since then the plant has been broken in and mill operators trained.

mill operators trained.

Usual start-up troubles were encountered including trouble in grinding maximum tonnage with Japanese-made balls, shortage of electrical motors, and handling of badly oxidized surface capping. Daily improvements in operation are being made and tonnage increased. Operational results through April 24th are: 4,024 tons concentrate produced assaying 21.85 percent copper, and 6.33 percent H₂O. Total copper recovered, 1,758,860 pounds. Tvpical daily operating results: head sample 1.16 percent copper, 2,203 tons milled; rougher flotation concentrate 25.80 percent; selective concentrate 28.63 percent; selective concentrate 28.63 percent; copper flotation tailing 0.32 percent copper. This tailing will be pyrite concentrate in the future. Until the mill is operating at

maximum capacity, the pyrite is not be-

Several benches in the mine are reaching primary ore and mill recovery will improve as more sulphides are encountered. Sulphidizing with sodium sulphide has not appreciably increased oxide copper recovery on ore from the upper benches which has been mill feed to date. Waste stripping continues with shovels and trucks on the upper benches. Four 22-ton Euclid trucks and one two-yard Lorain Diesel shovel are on waste. Four 8-ton International trucks and a second two-yard shovel are on ore. A third shovel alternates between ore and waste with two 10-yard Fusos (Japanese Diesel trucks) for hauling.

trucks) for hauling.

Plans are underway to concentrate stripping during the dry season and a fourth two-yard Lorain shovel and four additional 22-ton Euclid trucks are on

order.

First concentrate, 1,200 tons, was loaded from the company's pier at Sangi on May 2, and a 1,800-ton shipment on May 4. This concentrate was loaded into

on May 2, and a 1,800-ton shipment on May 4. This concentrate was loaded into Japanese ships for delivery to Mitsubishi Metal Mining Company's Naoshima smelter.

A complete description of the Atlas project was reported in the September 1954 issue of MINING WORLD, pages 62 to 65.

Tanganyika Has Large Tonnages of Pyrochlore

Large tonnages of high-grade pyrochlore ore have been disclosed by geological survey and investigation in the carbonatite ring-structure at Panda Hill, near Mbeya in Tanganyika

carbonatite ring-structure at Panda Hill, near Mbeya in Tanganyika.

Pyrochlore (NaCaCb₂O₄F), essentially a sodium-calcium columbate, is the most important columbium ore of the near future. It occurs here in form of fairly coarse crystals, the average size being larger than that found in the carbonatite ring structures at Sukulu, Tororo, Uganda (See Mixing World, September 1953)

and March 1954); Nkumbwa Hill, Northern Rhodesia (MINING WORLD, October 1953); and Chilwa Island, Nyasaland. This should facilitate extraction. Pyrochlore has been found in the residual weathering soil deposit as well as in the carbonatite in situ.

The Mbeya ring structure was discovered in 1953 by the Geological Survey Department, Dodoma. In view of the economic importance of the discovery, the area was declared a Government reserve against staking.

against staking.
Several large overseas and South African mining groups are now tendering for the exploration rights of this deposit.

Carbonatite ring structures are becoming more important as potential sources of columbite. In them columbium minerals are generally found in disseminated forms.

To date nine of these structures have been discovered in Africa and all are being explored and developed by Government parties or large mining groups.

ASARCO To Develop Mexican Cu-Ag-Au Mines

The American Smelting and Refining Company has taken over development of the El Centinela and Santa Teresa mines at Concepcion del Oro, state of Zacatecas, Mexico. The mines had been leased by ASARCO to a Mr. Strozzi a number of years ago, and his contract expired last February.

Mining will be by the "glory hole" method, which will require about seven months of underground preparation and stripping of the overburden. Equipment for this work is en route to the site.

The company reportedly plans a daily output of 150 metric tons of ore with an average content of 29 grams silver, 1.8 grams gold, and 3.8 percent copper per ton. Reserves are estimated at about 18,-000,000 metric tons.

James Hannan is acting as general superintendent.



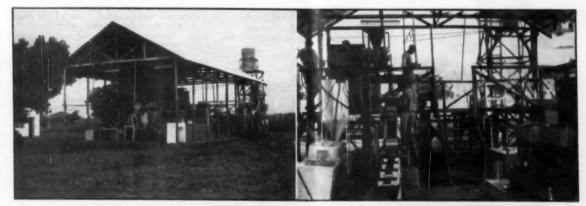
UNION OF SOUTH AFRICA—The two shafts of Hartebbestfontein Gold Mining Company Ltd. have now been connected, and an extension of underground operations generally can be expected in the immediate future. Trial milling has started.

milling has started.

SOUTH WEST AFRICA—The South West African Administration has granted a concession to Kimberley West Diamond Corporation Ltd. over about 5,000 square miles in the vicinity of the coastal sections of the Kunene River on the South West African side of the border with Angola. Prospecting will start soon. A concession has also been secured to prospect for minerals in general in the Groot-fontein area.

FEDERATION OF RHODESIA AND NYASALAND—Chibuluma Mines Ltd., which expects to begin production toward the end of this year, will have an annual output of 16,000 long tons of copper and 250 short tons of cobalt. The ore contains 5.23 percent copper and 0.25 percent cobalt. When the mine is in full production, 40,000 tons of ore will be milled each month. Known ore reserves give the mine a life expectancy of about 15 years. The town of Kalulushi, which has been developed for the project, is already a flourishing community. A new road has been completed which links the mine with Kitwe about seven miles away. The project is part of the Rhodesian Selection Trust group, and is being developed at a cost of about £ 6,000,000.

UNION OF SOUTH AFRICA—Following the decision of Freddies Consolidated Mines Ltd. to suspend operations in the area served by the No. 1 and 2 south shafts, agreement was reached with Free State Geduld Mines Ltd. for



Tororo Sets Up Test Concentrator for Apatite In Uganda

Tororo Exploration Company has erected a small test unit at Tororo, Uganda for research into mineral dressing problems in connection with the discovery of large deposits of soil containing apartite and pyrochlore. An exterior view of this experimental plant is shown at left above. The right photograph of the interior shows part of the test equipment including scrubbers, ball mill and classifier unit, hydrocyclone, magnetic separator, and flotation cells. Tororo was formed by Monsanto Chemical Company, Frobisher Ltd., and Uganda Development

opment Corporation in 1952 to explore the mineral wealth in the Sukulu district under an exclusive prospecting license from the governor of the Protectorate. The existence of more than 200,000,000 tons of sail containing workable amounts of apartie and pyrochiore was indicated by the drilling program. From this, it is estimated that about 100,000 tons of apartie and 1,000,000 pounds of columbian pentoxide could be recovered annually.

the latter to purchase the No. 2 south shaft and ancillary installations. Included, too, are 1,300 claims extending northward from the common boundary and covering the installations mentioned above, except for the Freddies South reduction plant. This leaves Freddies Consolidated with 8,893 claims. The acquisitions will benefit Free State Geduld by providing additional ventilation facilities, and access to the northern section of the Free State Geduld lease area, as well as the extra claims. Free State Geduld's lease area now covers 6,559 claims. Freddies will receive 300,000 Free State Geduld shares at £5 per share.

Geduld shares at £5 per share.
GOLD COAST-Ashanti Goldfields
Corporation Ltd. is proceeding with reorganization of its mine according to plan

and it is reported that the Cote d'Or reef with its high values is practically fully developed, as far as present levels are concerned. Replacement of the Cote d'Or ore by the Main Reef necessitates sinking of the Eaton Turner shaft which will probably reach its full depth this summer. After that stage has been reached, technical consideration will delay hoisting for some months but it is hoped to have the cages in operation by 1956. According to the company's consulting engineer, average monthly output this year will be 26,500 tons yielding 16,500 ounces gold which is equivalent to a grade of 12.46 dwt per ton. During 1954 average value recovered was 12.92 dwt. The drop in grade is largely due to the fact that the tonnage in reserve has been

greatly increased by the inclusion of large tonnages of lower grade ore from the Ayeinm and Justice mines.

KENYA—The location of an extensive deposit of monazite has been reported at Mrima Hill near the boundary with Tanganyika south of Mombassa. Surveys of the deposit have been conducted and samples are being tested at the Harwell research station in the United Kingdom.

NIGERIA—The United States purchasing program of columbite-tantalite concentrates may be completed earlier than the December 31, 1956 deadline. The program calls for purchase of 15,000,000 pounds of contained pentoxide and runs until the 15,000,000 pounds are delivered or until December 31, 1956, whichever occurs first. Half of the required quantity had been stockpiled by the end of 1954 with receipts accelerating during the last quarter of 1954. At this rate the program is expected to be completed by the sumper of 1956 and perhans earlier.

mer of 1956 and perhaps earlier.

UNION OF SOUTH AFRICA—City
Deep Ltd. is engaged in a program of
providing return airways and reports a
steady improvement in working conditions. The company plans to install an
underground cooling plant in the K.3
sub-incline shaft area to provide for future development and stoping operations.
Six K-line sub-incline shafts are being
sunk to open up the deeper levels, and
two now have been equipped with permanent hoists. Opening up of the deep
levels below the 8,500-foot horizon proceeds satisfactorily. The future of the
mine depends upon these deep levels
where, with a larger working force, a
greater development footage and an increased tonnage mined were accomplished. The extension of mechanization
is helping to raise the tonnage milled.
Over the past three years, the yield has
declined from 4.06 to 3.818 dwt a ton,
but the ore grade mined is being kept
as high as is compatible with sound mining practice at depth.

SOUTH WEST AFRICA—Industrial
Diamonds of South Africa (1945) Ltd.
which recently initiated productive opgrations in its newly discovered diamond-

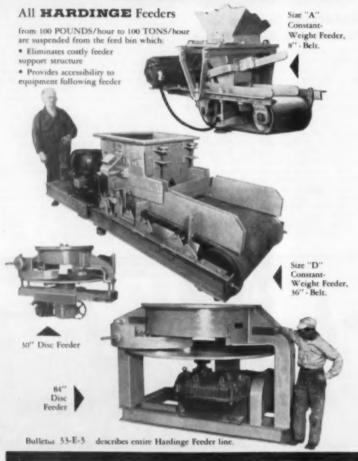
SOUTH WEST AFRICA-Industrial Diamonds of South Africa (1945) Ltd. which recently initiated productive operations in its newly discovered diamond-bearing marine terrace at Saddle Hill North in the Luderitz district recovered 1,335 metric carats from 4,535 loads treated in the quarter ended March 31. This was equivalent to about 0.3 carats per load. An additional plant and machinement beautiful production of the production o

per load. An additional plant and machinery are being installed.

NIGERIA—The Nigerian government has granted a new consolidated lease for 21 years over the Kontagora Lode area to the Amari Mines Ltd. This is subject to proving of extension of the lode in depth and installation of a crushing plant to treat dumps of residual ore as and when it is considered expedient. A few months ago the mine manager examined an area approximately 10 miles from the Maidubi camp and discovered a mineral which was later identified as tantalite. An area of about 225 acres was then examined and samples indicated that the whole area might contain the same metal. An application has now been made for an exclusive prospecting license over this discovery which is quite apart from the Kontagora lease mentioned first. Exploration has also shown that pegmatite deposits exist on four of the company's alluvial leases.

UNION OF SOUTH AFRICA-Vaal Reefs Exploration and Mining Company Ltd. established a new world shaft-sinking record for all types of shafts in March, with an advance of 667 feet.

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This was achieved in the vertical ventilation, 18-foot-diameter, circular component of the No. 1 twin shaft system. The broken rock was loaded manually; four shifts were worked a day. Sinking operations were started in September 1953 and by the end of March 1955 a depth of 2,568 feet had been reached, an average monthly rate of about 367 feet. The monthly average during the quarter ended in March was 606 feet. The previous record of 597 feet was established in the Merriespruit No. 2 shaft and involved the use of the cactus-type grab.

GOLD COAST—With the completion of servicing installations at the bottom of Bibiant (1927) Ltd.'s mine, steps can be taken to accelerate exploration. By using a permanent hoist for sinking, the internal shaft can be put down at a much faster rate than normally possible and it is planned to sink the shaft to the No. 28 level this year. When completed, lateral development will begin on No. 21 and 24 levels. Concentration on sinking and opening up of the mine in depth will not add to the ore reserves this year, but hoisting and other equipment is planned for these levels to make high speed development possible.

velopment possible.

BASUTOLAND—Jack Scott, chairman and director of finance and mining companies which are now associated with the General Mining and Finance Corporation group, has personally secured a three-year diamond prospecting concession over the whole territory of Basutoland. There is no definite knowledge as yet about whether diamond deposits have already been located or even exist. Basutoland is a British protectorate. It is bordered by the Orange Free State, Nepal, and Cape Province, but is not incorporated in the territory of the Union of South Africa.

ANGOLA—The Government Mines and

ANGOLA—The Government Mines and Geological Services has carried out numerous reconnaissance and radiometric surveys recently for radioactive minerals in geologically favorable areas. Several zones showing larger anomalies have been located, and a promising samarskite deposit (a uranium-bearing columbate and tantalate) has been found. Future investigations are to be carried out in conjunction with the Portuguese Atomic Energy Commission. These will probably include the granite highlands of Benguela, the asphalt-bearing formations to the north of the Cuanza River, and the Tertiary phosphate deposits of a shore zone stretching from Landana to Ambriz.

FRENCH MOROCCO—A washing plant was constructed at the graphite deposit at Fral-el-Ma during last year. It is expected to produce a richer concentrate of between 75 and 80 percent.

ALGERIA—Societe Nord Africaine du Plomb (N.A.P.), through a wholly owned

ALGERIA-Societe Nord Africaine du Plomb (N.A.P.), through a wholly owned Algerian company, continued to produce lead-zinc ore from its mine in Algeria during 1954. 158,388 metric tons of ore containing 13.70 percent zinc and 1.67 percent lead were milled. Further development of the property was resumed from El Abed shaft located about 7,000 feet easterly from the center of the present production. Development work from El Abed shaft included 3,500 feet of crosscutting and drifting, and about 1,800 feet of diamond drilling. Encouraging mineralization was encountered about 800 feet northwest of the shaft. An underground connection will be made between this point and the workings to the west where the ore is presently being mined.



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wheel life and easy haulage. Card engineers are happy to consult on any haulage problem. No obligation.



The property adjoins the properties of Societe des Mines de Zellidja. French interests own 51 percent of the capital stock in Societe Nord Africaine du Plomb; Newmont Mining Corporation owns 31.85 percent; and St. Joseph Lead Company 17.15 percent.

BELGIAN CONGO—Union Miniere du Haut Katanga, one of the world's largest producers of cobalt, copper, and uranium ore, will celebrate its golden jubilee (50 year) in 1956. All of the old European employees, already retired, will come from Belgium at the expense of the company to take part in the commemoration ceremonies. The company plans to give three prizes of \$5,000 each for the best work submitted to its board on topical medicine, nuclear sciences, and industrial use of certain nonferrous metals. The competitors must be Belgian citizens.

UGANDA—A London company, Overseas Prefabricated Structures, is planning to form an associated company in the territory for the development of a recently discovered extensive deposit of vermiculite. An expected byproduct will be iron concentrate.

BELGIAN CONGO—During the year, the Sermikat, tin producing company in Mitwaba will move part of its plants and personnel north of town where more promising tin deposits are reported to have been found.



INDIA—New rules governing the country's minerals resources, and "to ensure their development on systematic and scientific lines," have been announced by the Union Deputy Minister for Natural Resources. Under the new rules, every owner of a mine will have to employ a full-time or part-time geologist or mining engineer to bring prospecting and mining operations into line with approved practices. Small mine operators who might find it financially difficult to hire such experts are expected to form cooperatives for economic and scientific development. Scientific methods of working the mines must also be adopted. A manual of instructions has been prepared which will enable less informed groups within the industry to familiarize themselves with the latest methods and techniques of mining. Redress of grievances can be made within 30 days to the Central Government.

MALAYA-Petaling Tin Ltd.'s No. 5 dredge is undergoing trial operations and should be in full production shortly. Alterations made to the No. 3 dredge in order to enable it to recover values below its normal maximum digging depth have proved satisfactory, and it is now intended to rehabilitate the No. 4 dredge in a similar manner so that it may operate in an area previously dredged where boring has proved appreciable values. With the No. 6 dredge operating in comparatively high-grade virgin ground, the No. 5 dredge producing satisfactorily, and the No. 5 dredge resuming operations, an appreciable increase in overall output is expected, provided that production is not curtailed by the operations of the International Tin Agreement.



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Square conditioner tank improves flotation floorplans

The Wemco Conditioner is most commonly furnished in a square tank of the same dimensions as a Wemco Fagergren Flotation Machine. It fits neatly in line with the flotation machines that follow it. Asies can be straight and uniform. Total floorspace requirements are reduced to a minimum and plant operation is simplified. (Round tank units are available if desired.)

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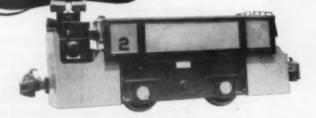
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109 Stanton St. Greensburg, Pa. TURKEY—An agreement has been signed between the Eti Bank and a French company, Pechiney, providing for the first time in Turkey. The installation will cost about \$5,000,000 and will produce 8,000 tons of ferrochrome and 4,000 tons of calcium carbide per year.

PAKISTAN—Negotiations are reportedly under way between the Pakistan government and a United States firm for prospecting of manganese deposits in the Lasbella district of Baluchistan. A geological survey of this area has indicated manganese deposits of commercial grade near the town of Bela, and it is believed that other minerals, including chromite, may also be present.

may also be present.

MALAYA—The Hong Kong Tin Dredging Company, Ltd. reports that its dredge reached a record depth of 150 feet in a waterway near Penang. The material dredged under water is hard rock which has a much higher tin content than material dredged at shallow depths. The dredge used is steam-operated with a four-rope crane working at a radius of 35 feet. Capacity of the grab is three cubic yards.

TURKEY—The first shipments of chromium have been made to the United States under an arrangement providing for 100,000 tons of Turkish chromium in exchange for U.S. grain. Chrome exports had declined considerably last year much to the concern of government officials. A number of inquiries have been received from other countries this year, but it is said that the bids are too low, averaging about \$33 for ore containing 48 percent CrOb.

PAKISTAN—The Pakistan Industrial Development Corporation has completed negotiations with the Freidrich Krupp steel firm for construction of a steel plant in Pakistan. The plant would be located at Kot Adu on the Indus River and would have an initial capacity of 55,000 tons of crude steel annually. This would eventually be increased to 350,000 tons. Coal and ore deposits are reported to be close to the plant site; natural gas would be supplied by pipeline to deposits 200 miles away.

JAPAN—The Light Metal Association reports that overseas demands for Japanese primary aluminum are steadily increasing, but that the smelters cannot keep up with the requests because of domestic demand. Brazil and West Germany are recent interested purchasers. Domestic demand is reported to be increasing to such an extent that the stocks of three leading smelters have become normal. Stocks at the end of February amounted to 5,880 tons compared with 7,847 tons at the end of January.

INDIA-Construction of India's first nuclear reactor has started at Trombay, a surburb of Bombay, and will be completed early in 1957. This first reactor will be an experimental one, using natural uranium from sources available in India. Its capacity will be a few mega-watts (one mega-watt equals 1,000 kilowatts). The deposits of monazite sand on India's west coast are being processed at Alwaye, Travancore-Cochin state, for the project.

PAKISTAN—The government is now working out a plan for the establishment of an antimony ore refinery in the country. The refinery would treat ore from Chitral state.

JAPAN-Five Japanese firms have concluded a contract to export 500 tons of aluminum to Pakistan, the first Japanese exports to that country since the war.
The firms are Messrs Iwai Sanguo, Nissho, Dalichi Bussan, Sumitomo Metal Mining, and Kinoshita. Currently being negotiated is another contract for the export of 500 tons of rolled aluminum products between two Japanese firms and Pakistan.

PAKISTAN-A recent survey conducted with the help of foreign experts, is re-ported to have revealed that Attock, Mianwali, and Sargodha districts of Pun-iab and Chitral States have rich deposits if iron ore, contrary to general belief that Pakistan had no such deposits. Prospecting work has already started at Mianwali and deposits of 20,000,000 tons of iron ore have been revealed, according to Commerce Minister Rahimtoola.

CHINA-The Ministry of Geology has received a report from one of its prosreceived a report from one or its pros-pecting teams which is said to have con-firmed existence of two huge iron ore deposits near Paotow in the Inner Mon-golian Autonomous region. Extensive geological prospecting has been under way there since 1950. The deposits are said to be large enough to warrant construction of an iron and steel plant.



GREECE-The Larymna nickel mine is expected to be ready for operation by September. A daily production of 160 tons is anticipated. The ore will be processed locally with machinery provided by the German firm of *Krupp*. Harbor facilities and processing furnaces are now being installed. Three additional furnaces be used at the works later, quadrupling the concentrate production

ENGLAND—A small amount of gold was sold by Soviet agents in the London market during April for the first time in more than 12 months. Silver sales by the Soviets have been taking place in London since March.

AUSTRIA - Bleiberger Bergwerks Union's zinc processing plant at Gailitz will be ready for operation later this year. Basic construction of the plant, which is expected to put an end to the meed for shipping zinc ores to Germany for processing, has been completed. Initial capacity of the operation will be 6,000 tons per year with an ultimate production of 10,000 tons.

BULGARIA - A trade agreement signed with the Soviet Union provides for Soviet shipments of non-ferrous metals and rolled goods to Bulgaria during 1955. Bulgaria will deliver concentrates of non-ferrous metals to the USSR.

ITALY-Sicily's sulphur mines closed down March 20 after owners decided that market prices were not covering the cost of production. The shutdown will be for an indefinite period of time, according to the mine owners, who state that government efforts to aid the industry have been inadequate.

SWEDEN-An output of 130,000 tons of iron ore is anticipated by the tons of iron ore is anticipated by the Boliden Mining Company at its Rudtic-baeck mine near Adak, Vaesterbotten. A plant is being erected at Kristineberg to concentrate the ore. Extension work now in progress at the mine will increase yearly production to 180,000 tons. The deposit, which has been worked for four years, is expected to last at least 20 years

WEST GERMANY-The Bayer Works will assist in the mining and processing of uranium ore found in the Black Forest and Bavaria. Because of the low U₃O₈ content (0.1 to 0.3 percent) of the ore, concentrating will be done at the mines.

USSR-Non-ferrous metal production in Russia is expected to show a moderate increase in 1955. A constant expansion has been noted since 1950. Metal production goals, in metric tons, are as follows: copper, 420,000 tons; lead, 335,000 tons; zinc, 260,000 tons.

YUGOSLAVIA - Expansion of the bauxite industry is gaining Yugoslavia new importance in the European alu-minum market. Combined output of the minum market. Combined output of the country's five major mines is scheduled at 870,000 tons in the near future. Main sources of bauxite (and current production figures) are: Drnis mine (200,000 tons); Mostar deposits (300,000 tons); Rovinji (185,000 tons) and Umag (35,000 mines in Istria; Niksic mine (150,000 tons). tons).

SCOTLAND-Siamese Tin Syndicate. Ltd. decided at a recent stockholders meeting to go ahead with plans to deelop the Lowland Lead Mines at Lead Hills, Lanarkshire. An exploration program is planned on the upper levels of the Wanlockhead workings, where development work has already indicated some 11,500 tons of 8.5 percent lead and 5.6 percent zinc, and adjacent to and west of the Wanlockhead vein system. Plans are also being formulated for the erection of a mill to treat the ore now available.

POLAND-Production will soon start at Poland's newest zinc processing plant port from Warsaw states. Most of the machinery for the unit, an electrolytic plant, came from the Soviet Union.

HUNGARY-Bauxite production is re-ported on the increase with the goal for

1955 set at more than 200,000 tons. Output for 1954 was reported at 170,000 metric tons. Aluminum production target for 1954 was 32,000 metric tons, but it is not known whether this goal was reached.

ENGLAND - Development of the North Yorkshire potash deposits has been discontinued by Imperial Chemical Indiscontinued by Imperial Chemical Industries after seven years of work involving more than £ 400,000. Further exploration of the deposits can only be carried out by a group with extensive deep mining experience, ICI believes, and has announced that its geological and technical information is available to the government or the firm of Fisons, which has done drilling on the property, should either group wish to continue work. In 1950 it was estimated that the area contained at least 200,000,000 tons of potash.

POLAND-An iron deposit has been located near Leczyca in the Lodz district, and attempts are now being made to clear the area. A mine shaft is planned, and the first smelting test will be made in the Lodz laboratories in August.

SWITZERLAND – The International Conference on the Peaceful Uses of Atomic Energy will be held in Geneva from August 8-20 under the auspices of the United Nations.

SWEDEN-Scandinavian Ore Company has been founded to work the recently discovered lead-silver deposit at Lillhardal. First shipment of the ore, which is in the same sandstone forma-tion as Idre, is planned for Germany in the near future.

NORWAY-A/S Norsk Bergverk is expanding its plant at the Soeve columbium ore fields near Ulefoss to give a monthly production of approximately 30 tons. Current production amounts to about 15 tons of 50 percent Nb₂O₅ concentrate each month. Mining is now limited to one of the marginal carbonatites, the Cappelen Dike, where about 1,500,-000 tons of ore have been located.



Recovering Copper Sulphates in the Near East

This leaching plant of Cyprus Mines Corporation on the Island of Cyprus in the Mediterranean Sea is now economically extracting acid soluble copper from pyritic ore. Previously non-recoverable, the material is now treated in a special addition to the existing flotation plant. The acidproof equipment includes four Dorr thickeners and four Dorr classifiers. The complete plant new leaches 2,000 long tons per day of minus V_2 -inch copper ore. Derr-Oliver, inc.'s consulting engineering department in Stamford, Connecticut designed the plant, and on associated company, Dorr-Oliver, Ltd. of London, supplied the equipment in the initial flotation plant.

ENGLAND—The British Sulphur Corporation Ltd. has assumed the functions of the executive office of the Sulphur Exploration Syndicate, partly for administrative reasons, and partly to provide necessary financial backing for a continuation of the Syndicate's activities under the same management. Offices of the corporation will be at 4, Grafton Street, London. The objects of the corporation are reported to be similar to the syndicate except that there will no longer be the same emphasis on exploratory activities.

ALBANIA—A 25 percent increase is schooling mine at Bulshil during 1955. This deposit, said to be "unlimited," was mined by the Italians before World War II, and was reactivated in 1947. It is the country's only chromium mine, and is said to be full mechanized.

BULGARIA—About 700 workmen and 2,200 soldiers are reported to be working in the uranium mines of Porcha, Goten, Baroi, Maj, Seslavtzi, Monastiv, and Kremikortzi. Production amounts to about 1,100 metric tons.

ITALY—A number of exploration permits have been granted recently for areas of Sicily where drilling for sulphur and oil brought indications of potassium salts and caused a revival of mining interest. The presence of magnesium and potassium salts in the fairly extensive rock-salt formations of Sicily had been known for a long time but had never been properly investigated. Geophysical surveys and drilling have now been undertaken and what has been determined so far seems promising.

CZECHOSLOVAKIA-The Pribram uranium mines are said to be increasing

in importance, with 14 shafts at present in operation. Nearby camps at Voina and Bystiz are reported to house 3,000 prisoners used to operate the mines.



LATIN AMERICA

PERU-Marcona Mining Company, a joint undertaking of Utah Construction Company and Cyprus Mines Corporation, is conducting routine geological investigations of iron ore deposits in the vicinity of Santa Lucia, northeast of Arequipa. The firm reportedly has an option on the property which covers an area of about 600 hectares. Weston Burret, chief geologist for Utah Construction, and Herbert Kursell, consulting engineer for Marcona, are making the investigation.

CUBA-The San Fernando mine has resumed production of zinc concentrate after being abandoned for years as commercially unproductive. Located in the Las Villas province, it was first developed in 1830. Recently, modern mining and extracting equipment has been installed and the mine is producing about 300 tons of zinc concentrate and 100 tons of copper monthly.

BOLIVIA—The German firm of Krupp and Lurgi has filed with the Corporacion Minera de Bolivia the first part of a report on the possibilities of installing a tin smelter for low-grade ores in Bolivia. The report announced the presence of enough fuel, such as petroleum, to permit the operation of such a plant. Studies are continuing.

BRAZIL—The Reynolds Aluminum Company is reported to be interested in the possibility of installing an aluminum plant in the northern part of Brazil. It is said that the firm considered this possibility once before but decided against it because there was no electricity available. The situation has changed with the recent dedication of the Paulo Afonso buttonless trip and the process of the pro

VENEZUELA—The Venezuelan government has been studying for the past year the possibilities of establishing a furnacing plant for iron ore within the country, with the result that two will now be erected in the next three years. One will be built by the government and the other by private industry. As a result, too, geologists and mining engineers have undertaken intensive exploration for manganese ore, limestone, coal deposits of this work have not yet been announced.

CHILE—Braden Copper Company reportedly is about to complete negotiations with the Chilean government concerning enlargement of the El Teniente plant this year. An investment of nearly \$2,000,000 is contemplated, which would enable an increase in the year's output by 10,000 tons and probably by 25,000 tons in 1956. In February 1955, the plant set a new record with an output of 11,870 metric tons of blister and fire-refined copper.

CUBA-Copper mines in Matahambre Valley in Las Villas province produced 72,998 tons of copper concentrate during the first three months of this year. Of this, 14,604 tons were exported. The Matahambre mines produce virtually all of Cuba's copper. They are owned by Minas de Matahambre, S.A., a Cuban concern in which the American Metals Company has a small interest.

Company has a small interest.

BRAZIL—The Central Eletrica Itutinga, dedicated in February by the governor of Minas Gerais State, will permit
a large expansion of the mining industry
in this state, according to George L. Wilcox, vice president of Westinghouse
which furnished \$3,500,000 for the project. Central Eletrica Itutinga, located between the cities of Lavras and Sao Joao
del Rey about 70 miles south of Belo
Horizonte, will serve a large area where
most of the iron, manganese, and uranium ores are found.

VENEZUELA—For the first time in more than a decade, the gold mines of the Callao district may show a dividend. Once famous for their output, production dwindled in recent years. In April 1953, the government took over the property and began to recondition the mines and plants. The district was then leased to a newly formed company, Minas de Oro de El Callao, which was able to produce about 160,000 metric tons of ore for milling during 1954. From this came an output of 1,717,848 grams of gold. Average grade of the ore was about 12.5 grams per ton.

SURINAM—Surinam Bauxite Company expects production in 1955 to be about 2,370,000 tons, or about 400,000 tons (roughly 15 percent) below last year's output. In 1954, output reached a record 2,775,796 metric tons, with net profit equivalent to about \$5,000,000.

CHILE-Chile Exploration Company, subsidiary of Anaconda Copper Mining



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Company, signed a new wage contract with the union in April, averting a strike at the company's big Chuquicamata copper mine. The agreement runs to May 1956, and involves substantial pay increase retroactive to the beginning of the year when the contract expired. Negotiations are continuing with another Anaconda subsidiary, Andes Copper Mining Company, which operates the Poterillos mine.

CUBA—The Bureau of Mines has released figures on production and exports from five chrome mines in the Baracoa area during the month of February. The mines and the tonnages mined and exported are: Cromita—631 tons mined, 2,129 tons exported; Cayo Guan—3,736 tons mined, 4,223 tons exported; Delta —366 tons mined, no exports; Canete— 440 tons mined, no exports; Potosi—597 tons mined, no exports.

MEXICO—Export of 28,200,000 fine ounces of Mexican-mined silver worth \$24,000,000 was made last year, according to the Bank of Mexico which supervised the entire movement of silver in the domestic and foreign markets. West Germany received 13,500,000 ounces; the United States 12,200,000 ounces; and France 2,500,000 ounces.

France 2,500,000 ounces.

BRAZIL—Tin production was substantially increased during the last part of 1954 with the discovery of two cassiterite deposits in the states of Rio Grande do Sul and Minas Gerais. In the first state the tin mineral is found in hydrothermal veins, while the second is in sedimentary deposits. The Minas Gerais deposit is in the district of Sao Joao del Rey, and covers more than 5,000 square kilometers. The deposit in the state of Rio Grande do Sul contains wolframite and chalcopyrite in addition to cassiterite. Brazilian production has been 300 tons annually, while consumption is about 3,000 tons. It is hoped that eventually Brazil will be able to meet her domestic demands herself.

CHILE-Empresa Nacional del Petróleo, a government agency which has handled all matters dealing with prospecting, drilling, and producing oil in Magallanes, has just finished building an oil refinery at Concón near the port of Valparaíso in collaboration with Kellog of Texas who supplied the design and technical assistance. This refinery will be able to supply the country with all the gasoline, Diesel oil, and kerosene that it will need until 1956. However, fuel oil for the steam power plants of Chile Exploration Company and Andes Copper Mining Company will have to be imported, as well as about 2/3 of the crude requirements of the new refinery, until enough producing wells have been drilled in the Magallanes to get all the crude that will be needed by the refinery. The crude deficiency will be obtained from Venezuela.



WESTERN AUSTRALIA — Western Queen N.L. will participate with Mountain View Gold Mines N.L. in a new company to be known as Day Dawn Gold Pty. One of the largest gold-mining drills in Australia will be used to drill 3,200 feet on an area of 300 acres ad-

jacent to the Mountain View mine. It is hoped to prove 1,000,000 long tons of one-ounce ore. The area is in the Murchison gold field, where the state mines department also will undertake a drilling program shortly.

QUEENSLAND—Australasian Oil Exploration Ltd. now has seven diamond drills proving its Mary Kathleen uranium deposit at Mount Isa. Activity has increased since the entry of Rio Tinto Ltd. into partnership with Australasian which holds nearly 80 other uranium leases in the Mt. Isa area alone. The Commonwealth government will establish an ore buying depot at Mt. Isa when circumstances warrant.

REPUBLIC OF THE PHILIPPINES

A series of new mills are currently being built. Mindañao Mother Lode Mining Company is erecting a 300-ton copper-silver-gold mill at Zambales near the Consolidated Chrome Mines. Lepanto Consolidated Mining Company reportedly is considering construction of an HMS plant to treat lower grade copper ore from its mine. Elizalde & Company is building a new 300-ton copper mill at Masara on southern Davao.

NEW SOUTH WALES—Initial production of concentrates has been recorded by New England Antimony Mines N.L. near Guyra. There is a ready market in Sydney for 60 percent material at &A 90 per ton.

TASMANIA-King Island Scheelite N.L. at Grassy, King Island, mined 896,351 tons of overburden for a recovery of 181,143 tons of ore in 1954, a ratio of 1:5. A new bench in the open cut has been opened at a height of only

10 feet above sea level. Ore reserves at the end of October were 3,164,000 tons, assaying 0.48 percent WO₂, these being calculated to 110 feet below sea level. Diamond drilling at the western end of the main ore body has proved that economic mineralization does not extend beyond 1,400 feet west or a total length of 2,300 feet. Abnormally dry weather now being experienced may cause a reduction in milling rate from the current rate of 5,000 tons per week.

REPUBLIC OF THE PHILIPPINES

—The Marinduque Iron Mines reports the conclusion of an agreement for the shipment of iron ore to Japan. For the period from April 1 to March 31, 1956, 275,000 tons of iron ore will be shipped to Japan. For the two years following this, a tentative arrangement calls for the shipment of 300,000 tons and 325,000 tons, respectively.

WESTERN AUSTRALIA—Drilling by Western Uranium Mines N.L. at Ravensthorpe has disclosed no additional uranium occurrences but has indicated good copper values. (Ravensthorpe was formerly an important copper field.) This drilling is on the fringe of the old Elverdton mine.

NORTHERN TERRITORY—Australian Uranium Corporation N.L. has been formed as an operating company to work Uranium Development and Prospecting Company's Adelaide River mine. Present ore reserves are 160,000 tons assaying 0.4 percent uranium oxide. Northern Uranium Development N.L. and Uranium Mines N.L. report that important additional radioactive anomalies have been located by airborne scintillometer near



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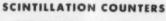
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INTERNATIONAL-

El Sharana mine at South Alligator River. The wet season delayed mining opera-tions until the end of April.

REPUBLIC OF THE PHILIPPINES -General Base Metals recently shipped 4,500 wet tons of both high- and low-grade manganese ore from Masbate and Bohol. Continuous deliveries are expected hereafter to complete a Pesos 1,000,000 contract for ore delivery with buyers in Japan as soon as possible.

TASMANIA-Output of the Electrolytic Zinc Company of Australasia will be reduced by 20 percent while power cuts caused by the water shortage prevail. Figures for the financial year to date had indicated a possible record production of 105,000 tons but this will not now be attained. Ore production from the company's mines at Rosebery will not be affected.

SOUTH AUSTRALIA-Geo-Surveys Ltd. has undertaken a search for large economic deposits of nickel and other economic deposits of mickel and other minerals in the northwestern part of the state on behalf of Nickel Mines of Australia Ltd. which was formed last year following discovery of nickel-bearing rocks in that part of the state. The rocks also convertised corporal patients and also contained copper, platinum, and chromium. A base camp has been established at Odmadatta and air strips have been built at the surveying site for drop-ping of supplies. Three geologists and a field superintendent are already on the scene. Latest location methods will be used for mapping and research.

TASMANIA-Moina Tungsten-Tin Mining Company N.L. at Moina has arranged for marketing of its tungsten concentrates. Initial production of coarse concentrate is now being treated. Mixed concentrate is now being treated. Mixed tin concentrate is being stored pending completion of the plant. Though initial output will be small (about 500 tons of ore per week), there are possibilities that this deposit may develop into a mine similar to Aberfoyle Tin N.L. at Rossarden. The latter, for a 32-week period ending in March, treated 36,525 tons of ending in March, treated 30,325 tons or ore for the following output: tin "first" concentrates 314.5 tons; tin "seconds" 31.9 tons; tin "slimes" 93.5 tons, tungsten concentrate 106.5 tons; tungsten residues 141 tons; flue dust 14.6 tons.

NEW CALEDONIA-Nickel production in 1954 was 524,714 tons, compared with 627,334 tons in 1953. This mineral contains 13,695 tons of nickel metal as compared with 17,060 tons in the previous year. Nickel exports in 1954 totaled 148,524 tons containing 4,347 tons of nickel metal, all of which was sent to Japan (except for 500 tons to France). Production of chrome dropped to 84,953 tons, compared with 121,592 tons in the previous year, containing 52.5 percent Cr.O₂ with a 3:2 ratio of chrome-to-iron.



BRUNSWICK-Heath Steele Mines, Ltd. has been formed by Ameri-can Metals Company, Ltd. and The In-ternational Nickel Company of Canada to continue the development of the Little River lead-zinc-copper-silver properties near Newcastle. American Metals owns

75 percent of the new firm and Inco owns 25 percent. Two shafts will be sunk and a goal of late 1957 has been set to bring the property into production at a rate of approximately 1,500 tons of ore per day.

ONTARIO—The headframe and ore bins of the Rix-Athabasca Uranium Mines Ltd's Smitty mine were completely destroyed by fire in April. The structures were insured. Reconstruction will require from two to three months, during which time no production from the Smitty will be possible, but ore is being produced from the Leonard and Smitty West Extension adits. Recent drifting and underground drilling in the latter adit has developed a substantial length and width of excellent grade ore.

BRITISH COLUMBIA—Jackson Basin Mines, Ltd. has reacquired the Sunset-Trade Dollar claims adjoining the Jackson silver-lead-zinc mine in the Slocan district. An immediate diamond drilling program is planned. Development is continuing at the Jackson property. The company also has arranged to explore the Destorada group and another group in the Beaverlodge Lake uranium district of Saskatchewan.

of Saskatchewan.

MANITOBA—A new company is being formed in which Western Selection & Development Company, Ltd. will have a substantial irterest. Its object will be to develop the nickel-copper deposits on Tow Lake, situated 36 miles from the nickel-copper deposits of Sherritt Gordon Mines on Lynn Lake. The new company will also have an option over uranium claims in the area of Higginson Lake. Extensive prospecting will probably be carried out in both areas.

ONTARIO—The International Nickel Company of Canada, Ltd. has completed its first full year of successful operation with the oxygen flash smelting process for treating copper concentrates. The process has reduced Inco's smelting costs and has also resulted in the production of a high quality furnace gas from which liquid sulphur dioxide and sulphuric acid are made. The company delivered more than 250,000,000 pounds of refined copper in 1954.

BRITISH COLUMBIA—Consolidated Mining and Smelting Company of Canada Ltd. is preparing its HB lead-zinc mine near Salmo for production. A \$2,-750,000 development program, started in 1951, was completed in March 1953 but production was deferred because of low prices for base metals. A large tonnage of sulphide ore was disclosed by diamond drilling. A 4,000-foot haulage tunnel was driven and a 1,000-ton concentrator constructed.

YUKON TERRITORY—The Yukon Consolidated Gold Corporation Ltd. will operate its dredges no. 4, 6, 8, 9, 10, 11, and 12 during the 1955 season. Hydraulic operations on Paradise Hill will also be continued, subject only to the necessary labor force being available. It is also expected that prospecting activities, being carried out jointly with the Consolidated Zinc Corporation of Canada, will continue to search for base metals.

ALASKA—The Spirit Mountain Mining Company has been incorporated in Juneau by J. B. O'Neill of Anchorage and Andrew Halvorsen and Leo G. Pierce of Seattle. The company owns nickel claims near Chitina on the Copper River.

MANITOBA—The International Nickel Company of Canada, Ltd. is investigating a possible nickel-bearing deposit adjacent to Moak Lake in the Mystery Lake area. Extensive surface drilling has been carried out, and a program of underground exploration and drilling will now be undertaken to obtain additional information. A 1,300-foot shaft is to be sunk. This will be followed by 10,000 feet of crosscutting and drifting at an estimated total cost of \$2,000,000.

QUEBEC—International Lithium Mining Corporation has completed financial arrangements with Dyno Mines Ltd. of Canada and now has more than \$600,000 on hand for further exploration of its property. Four drills have been put to work in the Figuery-LaMotte-LaCorne lithium area of Quebec, where the firm's holdings cover almost 5,800 acres.

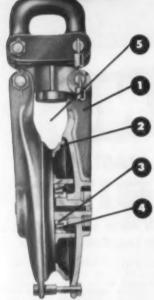
BRITISH COLUMBIA—Giant Mascot Mines at Spillimacheen is considering installation of a copper circuit in its mill if ore on the projected ninth level contains as much copper as eighth level ore. The anticipated early arrival of hydroelectric power is expected to result in lower operating costs. Values have been chiefly in lead, zinc, and silver.

ALASKA—Frank Waskey, Clarence Wren, Jim Putvin, and Charles Wolfe have incorporated the Red Top Mercury Mines. They will mine a property on Marsh Mountain near Aleknagik which was formerly called the Wren-Waskey-Wolfe prospect.

LABRADOR-First shipments of the 1955 season have started coming from







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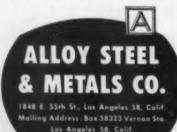
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INTERNATIONAL -

the Iron Ore Company of Canada's property at Shefferville. This will be the first full year of operation on a commercial basis, and the company expects to ship 7,000,000 tons. During its five months of operation last year, the company shipped 1.781.453 tons.

QUEBEC-Ten diamond drill holes completed by Copper Cliff Consolidated Mining Corporation on the Jaculet property in the Chibougamau district have reportedly returned some excellent ore intersections. These holes were drilled from the ice and the breakup terminated drilling early in April. Drilling on land along the westerly extension of the Jacu-let zone is now being done with three drills. This will test an unexplored area on the Copper Cliff property for a length of 2,000 feet where copper-zinc miner-alization is known to occur in surface trenches. Plans are being made to sink a shaft to investigate the Jaculet zones and to prepare them for mining. Hydroand to prepare them for mining. Hydro-electric power will be available when re-quired for underground work and for production. Copper Cliff has a lease-option agreement with Jaculet Mines which provides that Copper Cliff will re-ceive 60 percent of Jaculet profits, after Jaculet has been scipplyared for graper. Jaculet has been reimbursed for expen-ditures made prior to Copper Cliff entry into the situation.

BRITISH COLUMBIA-The Cody Reco base metal mine in the Slocan district has been reopened, and 17 men are trict has been reopened, and 17 men are employed in preparing for resumption of production. The nearby Carnegle mine has also reopened. In the Bridge River district, Bralorne Mines Ltd. reports good exploration results on new levels. On the 27th level, 527 feet of gold ore was developed over a width of 5.4 feet. On the 28th level, the ore is 1.173 feet in length averaging 5.1 feet in width and assaying 0.64 ounces of gold to the ton.

QUEBEC-United Asbestos Corpora-tion reports that work at the Black Lake property is progressing satisfactorily. Dredging operations have started. This will expose the asbestos ore under the water for low-cost, open-pit mining. Con-struction of permanent plant buildings should start soon.

LABRADOR—McGill University of Montreal has established a research laboratory in the heart of the Ouebec-Labrador ore properties of *Iron Ore Company* of *Conada*. The laboratory was built in Schefferville with the cooperation of Iron Ore Company and will make possible field studies from an advance base deep within studies from an advance base deep within the Canadian sub-Arctic. Initial work will be mainly meteorological, but the university hopes eventually to diversify the work so that all important field sciences will be

ONTARIO-Pronto Uranium Ltd. reports that plant construction is proceeding on schedule at its Blind River uranium property, and it is expected that the entire mill will be ready by September. The main shaft has reached its object to the control of the probability o iective of 590 feet, with all five level stations cut, ore passes well advanced, and crosscuts approaching ore on the first, third, and fourth levels and having reached it on the second level.

ALASKA-Gilmar Lode Mining Com-pany of Fairbanks is reopening the old Danzenger lead-silver property in the Bonnifield district. Last season the firm moved in equipment and built a landing strip at the property.

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ONTARIO—A fire in the No. 3 booster pump station of the Errington mine's dredging plant destroyed the enclosing frame building and electrical equipment, reports Steep Rock Iron Mines, Ltd. The booster station handles material from the "La Seine" dredge and discharges it into the west arm of Steep Rock Lake, A three-month delay followed while repairs were being made.

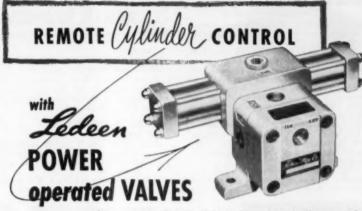
MISSOURI—The St. Louis Mining & Trading Company, which once operated a placer gold mine in Alaska and which has been inactive for some tme, has filed a voluntary petiton of bankruptcy in the U. S. District Court in St. Louis. Its petition listed as assets 282 acres in Alaska and some mining equipment.

SASKATCHEWAN—ViolaMac Mines, Ltd. has purchased 1,000,000 shares of stock in Lake Cinch Mines, Ltd., which is opening up a uranium property in the Beaverlodge Lake district of Saskatchewan. ViolaMac's main property is in British Columbia where 23,000 tons of ore were produced in 1954, making it the firm's second most profitable year of operation.

NEW YORK—The American Institute of Management awarded 30 Certificates of Management Excellence to mining companies for 1954. Those metal mining firms receiving the certificates were: American Metal Company, New York; Consolidated Mining and Smelting Company of Canada, Ltd., Montreal, Quebec; Homestake Mining Company, San Francisco; Hudson Bay Mining and Smelting Co., Ltd., Winnipeg, Manitoba; International Nickel Company of Canada, Ltd., Copper Cliff, Ontario; Kennecott Copper Corporation, New York; Noranda Mines, Ltd., Toronto, Ontario; Phelps Dodge Corporation, New York; and United States Smelting Refining and Mining Company, Boston. The group for mining and quarrying of non-metallic minerals, except fuels, included Freeport Sulphur Company, New York, and Texas Gulf Sulphur Company, New York.

ALASKA—An index of publications on Alaskan geology has been placed in open file in the Brooks Memorial Mines Building, at College; Room 117 Federal Building at Juneau; and 210 E. F. Golver Building at Anchorage, as well as numerous places within the United States. The index is meant to be of assistance to those desiring information on mineral resources of the Territory and will facilitate the location of references in the Geological Survey reports published prior to April 30, 1953.

SASKATCHEWAN—Mineral Research Ltd. has acquired title to nine uranium claims formerly held by Belcher Mining Company five miles southwest of Uranium City in the Beaverlodge area. Title to Belcher's 450-acre block was due to expire on December 10, 1954 since development requirements had not been met. However, an additional 30 days remained for the Toronto firm to file proof of such development. When that time expired at midnight January 10, Ralph D. Ross, president of Mineral Research, and his party of five who had bedded down in a tent nearby in sub-zero weather, began a complete restaking of the property. The new claims were filed and a court caveat obtained to register the firm's interest in the property. The Saskatchewan government finally awarded the claims to Mineral Research.





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Grab Samples

(Continued from page 3)

South Australia, refinery where solvent extraction will be used. This is quite in-

correct.

The Rum Jungle operation is one which we manage (through our subsidiary Company, Territory Enterprises, Pty. Limited) on behalf of the Australian Atomic Energy Commission, which is a Commonwealth (i.e. Federal) organization. The Port Pirie plant, on the other hand, is one section of an overall operation (the other part of which is located at Radium Hill, South Australia) located entirely in the State of South Australia and owned and operated by the Department of Mines in that State. Mines in that State.

Mines in that State.

We are not at liberty to disclose particulars of the disposal of the product from the Rum Jungle plant, but we can

say that it is not to Port Pirie and that the Rum Jungle project has no connection whatever with the South Australian project.

F. S. ANDERSON

Director

Consolidated Zinc Proprietary Limited Melbourne, Australia

It has recently been announced that the first shipment of uranium concentrates valued at \$450,000 has been made to the United States. Ed.

Read By All Staff Members

Dear Sir:

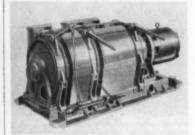
Please continue WORLD MINING. My copy is read here not only by myself, but by all members of my staff.

J. Russell The Kirwa Wolfram Mines Ltd. Kabale, Uganda

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U.S.A. Metal & Mineral Prices

METALS

	metals
COPPER:	Electrolytic. Delivered F.o.b. cars, Valley basis
EAD:	Foreign Copper, Valley basis
ZINC:	Prime Western; Fo.b. E. St. Louis 12.00¢ Prime Western; Delivered, New York 12.50¢
ALUMINUM: ANTIMONY: BISMUTH:	May 12, 1955
CADMIUM COBALT: COLUMBIUM:	Sticks and bers. I to 5 ton lots (Price per pound) \$1.70 97-99%, keg of 550 pounds (Price per pound) \$2.60
LITHIUM: MAGNESIUM: MERCURY:	98% (per pound) \$10.00-\$13.00 Ingets (99.8%) F.o.b. Valasco, Texas, per pound \$28.50¢ Flanks Spall lots Naw York \$311.00-\$312.00
NICKEL:	"F" Ingets (5 pounds), F.o.b. refinery, Port Calbourne, Ontario 64.50¢ Grade A. Brands. New York (Price per pound) Prompt delivery 91.25¢
TITANIUM: GOLD: SILVER:	99.3% + Grade "A" (Price per pound) \$3.50-\$3.90 United States Treasury Price \$35.00 per ounce Navly mined domestic. United States Treasury price 90½¢ per ounce
PLATINUM: ZIRCONIUM:	Foreign Handy & Harmon \$8.50 Par Ounce \$76.00-\$78.00 Sponge, Per Pound \$10.00
BERYLLIUM ORE:	ORES AND CONCENTRATES
DENTELION ORE:	Small lot purchases of Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at \$400.00 per short ton or by assaying at 8.0 to 8.9% BeO. \$40 per unit: 9.0 to 9.9%, \$45; over 10.0%, \$50.
CHROME ORE:	F.o.b. railroad car's eastern seaports. Long tons dry weight. African (Rhodeslan). 48% Cr.Ob. 3 to 1 Ratio
	Turkish, 48 Cr30s, 3 to 1 chrome-iron ratio. U. S. Government ore purchase depot Grants Pass, Oregon, Fase price, jumpy ore, \$115.00; fines and concentrates \$110.00 for 48% Cr3s and a 3 to 1 chromistic process.
COLUMBIUM- TANTALUM ORE:	3.5 to 1. Penalties for grades down to 42% Cr20s. At United States small for beryl purchase depots. \$3.40 per pound contained combined controlled in 50% over includes 100% benue.
IRON ORE:	Lake Superior, Per gross for Lower Lake Ports Mesabi, Non Bessemer, \$1.5% Fe. Second quarter \$10.10 Mesabi, Bessemer, \$1.5% Fe. Second quarter \$10.25
	Old Range Non Bessemer. Second quarter \$10.25 Old Range Bessemer. Second quarter \$10.40 Swedish. Atlantic Ports. 60 to 68% Fe. Contracts. Per Un 22.006
MANGANESE ORE:	Metallurgical grade. 48 to 50% Mn. Long ton unit \$2,88-50.91 Metallurgical grade. 46 to 48% Mn. Long ton unit \$0,87-50.89 Metallurgical grade. 45 to 46% Mn. Long ton unit \$0,77-50.82
	Chemical grade, 80% MnO ₂ . Per Ton. \$70,00 Demastile U. S. Government are purchasing depots: Demang, New Mexico; base price \$2,30 per long dry ton unit of recoverable managanese less handling and treating costs. Butte. Montana: (black and pink ores) base
	price of \$4.87 per long dry ton of 18% manganese etc. Phillipsburg, Montona base price of \$6.43 per long ton unit of 15% manganese etc. Small lot program f.o.b. railroad cars, minimum 40% Mn Base price (48%)
MOLYBDENUM CONCENTRATE: TUNGSTEN	\$2.30 per unit with premiums and penalities. 90% MoS F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers. \$1.05 **Demostle. 60% WO. Per short on unit
URANIUM ORE:	Foreign. 65% WOs Per short ton unit (Scheelite) \$33.00 Foreign. South American, Spanish, Portuguese \$31.00-\$32.00
one.	ORES AND CONCENTRATES 10 to 12% BeO. F.o.b. mine, Colorado
	is \$1.50 per pound and up to \$3.50 per pound of contained U.Os plus \$0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of \$0.25 per pound for each in excess of 10 pounds. A
VANADIUM ORE:	\$0.50 per pound development allowance paid on all ore purchases. At Ship- rock all ores with more than 6% lime are penalized for excess lime. Cernetite-Resceelite. V ₂ O ₅ in ratio of more than 10 parts to 1 part of U ₂ O ₅ .
	vale, Monticello, Shiprock, and Bluewater Per Pound V ₂ O ₈ \$0.31
BENTONITE:	NON-METALLIC MINERALS Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots \$12.50
FLUORSPAR:	Oil Well grade. Packed in 100 pound paper bags
	Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots \$12.50 Oil Well grade. Packed in 100 pound paper bags \$14.00 Astallurgical grade. 70% effective CaFz content per short ion F.o.b. Illinois-Kentucky mines \$22.00 Mexican. 70% f.o.b. border \$22.00 European, Atlantic Ports, 70% \$30.00 Acid Grade. 97% CaFs F.o.b. Kentucky, Illinois, Colorado \$50.00 Crade: F.o.b. mine per short ton \$3.00 to \$5.00 Plaster grades. Crushed and sized. F.o.b. plants \$7.00 to \$9.00 Long ton, F.o.b. Moskins Mound, Texas \$25.05 Expert \$30.50
PERLITE:	Crude: F.o.b. mine per short ton \$3.00 to \$5.00 Platter grades, Crushed and sized F.o.b. plants
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas

LONDON METAL AND MINERAL PRICES

	April 18, 1955 Per Long Ton USA Equivalent cents per pound!
COPPER: LEAD:	Electrolytic, spot £307 0s Od 38.37¢ Refined, 99.9% £102 10s Od 12.81¢
ZINC:	Virgin, 98% £ 89 Os Od 11.12¢
ALUMINUM: ANTIMONY:	Inget, 99.5% £163 0s 0d 20.37¢ Reguius, 99.6% £210 0s 0d 26.25¢
TIN: TUNGSTEN:	Standard, 99.75% E712 Os Od 89.00¢ Long ten unit, 241s equivalent to

Quotations on metals and certain over through the courtesy of American Metal Market, New York, N. Y.



GREATER FOOTAGE at LOWER COST with Sprague & Henwood's "ORIENTED" Diamond Bits

That's our story in a nut shell and we're proving it every day—not only in our own world-wide contract core drilling operations, but also through the money-saving results being achieved by hundreds of other satisfied users.

After extensive comparative tests had demonstrated to our satisfaction that drill diamonds cut much faster and last much longer when "oriented" in the matrix with their hardest edge or "vector" toward the work, we decided that random setting was both inefficient and wasteful. Since then we have standardized on oriented diamond bits and have produced THOUSANDS— in a wide variety of types and sizes; with both cast- and powdered-metal matrices.

Only' selected diamonds of suitable crystaline structure can be used and only specially trained and equipped setters of more than usual aptitude can be relied upon to orient diamonds correctly in the mold, but we are now fully organized for efficient production of ORIENTED DIAMOND BITS, at no additional cost to purchasers.

In terms of footage cost, these are the most economical diamond bits ever produced and we invite inquiries on that basis.

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PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.



Engineers Syndicate has new Scintillation Counter

Engineers Syndicate's model SC-10 is an all-purpose Scintillation Counter for prospector, operator and engineer. It can be used in the field for mobile, airborne surveys, drill hole logging and radiometric assaying. The instrument provides a direct reading scale for percent U₂O₈, and background count can be erased. An energy level control makes thorium determinations possible. For literature circle No. 75.

IT'S NEW (No.) CIRCLE IT



Exhibited at Convention Radial Screening Plant

The Nolan Co. of Bowerston, Ohio, displayed a Hein, Lehmann Radial Screening Plant at the American Mining Congress Coal Convention held in Cleveland May 16 to 19. Marked advantages in initial cost, maintenance, weight, and floor space requirements are said to be prime features of the Radial Screening Plant. A combination of partitioned and radial screen, it accomplishes preliminary dewatering. No driving agency is required. The only mobile part is propelled by the pulp, so there are no expenses for power consumption. For full particulars circle No. 77.

International Standards for Diamond Drills

"W" series drill rods and couplings now covered by dimensional standards are announced by the Diamond Core Drill Manufacturers Association. Similar announcement is being made by the Canadian Diamond Drilling Association. Countries outside of North America have indicated that they will also adopt these new standards. The new standards will make possible complete dimensional interchangeability on an international basis in the EW, AW, BW and NW sizes. More information will be available shortly in Bulletin No. 2, now in process of publication, by the Diamond Core Drill Manufacturers Association, Circle No. 71.



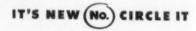
Save 40 to 50% by Making Your Own Carbide Rock Bit

The W. J. Dunn Company has developed a method enabling mining companies to make their own rock bits at a reportedly considerable saving. The Dunn Company will supply a forged, high-grade alloy steel bit body that is machined, threaded, slotted for carbides and ready-to-assemble for \$3.60. They will also furnish blueprints of the correct size and grade of carbide to buy direct from the carbide manufacturers. In addition to this, they supply the correct silver solder and flux that they have perfected, and found best for this type of work. Also, they have developed and are supplying a brazing and hardening unit operated by butane, propane or other gas. The cost of this machine, complete in every way, is only \$2,400. A Dunn Company representative equipped with a field unit will be glad to call on you and demonstrate free of charge how you can make your own carbide bits. To learn more about this circle No. 62.



High Speed Hard-Facing Process is Semi-Automatic

A new line of tubular fabricated alloy wires designed for open are application through standard semi-automatic welders has just been announced by Stoody Company. Essentially, this is a new process that requires no flux and offers the versathity of manual welding with the control of the fully automatic. Depositing 7 to 15 pounds of hard metal an hour, the combination of the new alloy wires and welding method makes possible speeds two or three times that of the manual process. Circle No. 70.





New Geiger Counter Sold by Nuclear Measurements

A new nortable Geiger counter designed for both amateur and professional prospecting has been developed by Nuclear Measurements Corporation. Known as Model GS-3, the instrument is designed to be lighter, smaller, more sensitive, and easier to service than any comparable Geiger counter now available. Engineered to broad tolerances and adaptable to wide temperature variations, it is said to be free of the "touchiness" generally associated with portable instruments. Circle No. 76.

BROWNIE HOISTS manufactured by Sanford-Day Iron Works are available in rated capacities from 2,000 to 24,000 pounds of rope pull and with speeds from 25 to 300 feet per minute. In the Brownie line you will find rigging hoists, haulage hoists, room hoists, car spotting hoists, hoist-retarders—hoists for every haulage use. For further information on this complete line of hoists circle No. 80.

DRAWPOINT LOADING with Eimco machines is explained in a series of bulletins, prepared by The Eimco Corporation, giving complete data on many jobs including costs and comparisons with chute and grizzly loading. For your copies circle No. 43.

SEPARAN 2610, introduced by The Dow Chemical Company is said to have shown the following advantages over other flocculants: stepped up settling rate, increased overhead clarity, improved filtration rate, decreased filter cake moisture, increased recovery, and reduced cost. For complete information on Separan 2610 circle No. 45.

ROCK BITS: Cleveland CRD one-use bits marketed by the Cleveland Rock Drill Division of the Westinghouse Air Brake Co. are said to cut drilling costs by faster drilling speed, less drill-steel breakage, and lower rock drill repair costs. For tull details on Cleveland's one-use bits and how they can cut your drilling costs circle No. 83.

AIR CYLINDERS: The Ledeen Manufacturing Company has available Bulletin No. 500, which covers their complete line of valves, cylinders, valve actuators, and air-hydraulic pumps and boasters. For your own copy circle No. 26.

4-WHEEL-DRIVE JEEPS: Warn Hubs, manufactured by the Warn Manufacturing Company, are said to stop front end drag when used in two-wheel-drive range and axle torque when used in four-wheel-drive range. Warn Hubs also claim, reduced front end wear by 50 percent or more, less wear on the engine, and savings on gas and tires. Circle No. 27 for more information.

URANIUM EXPLORATION: Nuclear Instrument and Chemical Corporation has developed a new detector system for airborne or ground vehicle uranium exploration. Known as the DS-7 survey system it consists of a Scintillation detector, count rate unit, ruggedized meter, chart re-

corder, and d.c. to s.c. converter. Pull technical details with typical installation suggestions and exploration techniques are given in Bulletin "DS-7 Explorations." Circle No. 28 for your copy.

MINERAL ENGINEERING: Western Machinery Company has available a new bulletin which contains valuable up-to-date mineral engineering information on wet classification principles and their application to Wemco S-H classifier design. It provides a store of useful information for ready reference by mine managers, general and mill superintendents, metallurgical and design engineers, millmen, students and others. This is a must, so circle No. 29.

WET MAGNETIC SEPARATORS: Dings Magnetic Separator Company now offers a new brochure covering the application of their full line of wet magnetic separators for taconite, magnetite, heavy media, roasted ores, pyrrhotite, beach sands, etc. This well-organized bulletin covers both concentration and separation service, and includes descriptions and functions of Dings Alnico and electromagnetic drumtype separators, as well as the company's line of belt type separators. Circle No. 18.

SAFETY EQUIPMENT CATALOG is now available from Willson Products, Inc. This new, easy-to-read, fully illustrated catalog is designed as a workable, everyday safety manual. It is divided into four major sections, eye protection, head protection, respiratory protection, and welding. All those who have an interest in industrial safety will find this catalog a reference book of great interest and value. Circle No. 19.

D-C MOTORS: Reliance Electric & Engineering Co. has a new bulletin describing its Super T line of d-c motors with dynamic response. Information is included on speed ranges, acceleration rates, enclosures, dimensions, and selection data. It also explains how dynamic response came about. Circle No. 21.

KING-SIZED PORTABLE MOTEL: Nucular Instrument Corporation is manufacturing a Portable Motel, which can be mounted on any pick-up truck to provide comfort and convenience in outdoor living. The interior is designed with cruiser compactness yet is sufficiently spacious for floor plans of each model. Ideal for prospectors and surveyors. Circle No. 22.

NON-WARPING DRAFTING PAPER: Drawing-papers of highest quality, manufactured by Elsaesser Technical Papers Ltd., are provided with an aluminum insertion so that the drawing-paper does not warp or shrink. The aluminum insertion does not change the quality of the paper in any way. This type of paper can also be used for duplication printing. Circle No. 56.

OPTICAL TRANSIT: For surveying, such as traversing and triangulation, the Askania Transit TK offered by the Geo-Optic Company, Inc. is finding wide use. Both graduated circles of the reading microscope, as well as the micrometer scale, can be read in any position of the telescope. Circle No. 57.

KREBS CYCLONES are precision made with machined steel shells. Fitted with the pressure moulded liners their complete weight is far less than cast iron or nihard cyclones. Engineered for an idealized force pattern, Krebs cyclones in sizes from 4 to 30 inches are available in either single or integral two stage units. Special designs are available for unusual classifications. Circle No. 58.

CATERPILLAR BOOKLET: "Your Job ... Your Equipment ... and Caterpillar Service," is the title of a new eightpage booklet prepared by the Caterpillar Tractor Company. The booklet tells how Caterpillar dealers have the facilities and skill to keep their customers' machines in a state of "going time," instead of "down time." Circle No. 5 for your copy.

INTERNATIONAL ENGINES: The International Harvester Company recently introduced two new engines which brings to 32 the number of power plants available for International R-line trucks. Characteristics of the expanded engine line include higher horsepower and torque output combined with fuel economy and longer operating efficiency. For more detailed information circle No. 20.

GRATING AND FLOORING: A 16page Data and Specification Manual covering all types of grating, open steel floor armor, stair treads, vessel linera, bridge decking and drain grates has just been published by the Klemp Metal Grating Corp., Chicago, Ill. The book is a handy construction for process industries. Circle tool for individuals or firms dealing in No. 32.

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to get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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PRICE REDUCTION of Seismograph Service Corporation's A-3 portable rotary drill has been announced. The A-3 is a complete rotary drill, fully powered for both drilling and pulling out. Hole depth of the lightweight is rated at 250-feet with a 4-inch bit, or 300 feet with a 3½-inch bit. For complete details circle No. 1.

DIAMONDS AT WORK is a 28-page illustrated-booklet which presents a concise description of the origin and characteristics of the types of diamond commonly used in industry and contains many illustrations of diamond products and their applications. A diamond drill bit catalogue is also available from Anton Smit & Co., Inc. Circle No. 2. DIAMONDS AT WORK is a 28-page

NEW 2-IN-1 BATTERY GRID developed NEW 2-IN-1 BATTERY GRID developed by Gould-National Batteries, Inc. com-bines the advantages of the two original designs. The new Diamond "Z" grid for storage batteries has high structural strength, yet still retains the uniform grid density of grid members. Circle No. 3 for more information.

HIGH STRENGTH WIRE ROPE: John A. Roebling's Sons Corp. has introduced a new line of "Royal Blue" wire rope which the manufacturer rates at 15 percent greater tensile strength than yester-day's strongest. The new line, known as Roebling type 1105, is now available in sizes ½ to 3½-inches in diameter. Circle No. 4 for literature.

CONVEYOR BELT MANUAL: Ther-CONVEYOR BELT MANUAL: Ther-moid Company has published an ex-tremely informative and helpful manual on conveyor and elevator belts. Tips on installation, inspection, cutting, loading, vulcanizing and repair are included. To insure longer life and best service from your belts, a glance at this bulletin is warranted. For a copy circle No. 6.

EQUIPMENT BULLETINS: Baldwin-EQUIPMENT BULLETINS: Baldwin-Lima-Hamilton Corporation announces the availability of revised descriptive bul-letins covering the Lima type 34 and 44 power shovels, cranes, draglines and pull shovels on crawler and wheel mounts. The type 34 is a 3/4 shovel and 20-ton crane; the type 44 is a 1-yard shovel and 25-ton crane. Circle No. 7.

AERIAL OR GROUND EXPLORATION for uranium with a highly sensitive Scintillation Detector System is described in bulletin DS-7 by Nuclear Instrument and Chemical Corporation. The company is marketing a complete system consisting

of a scintillation detector, count rate unit, meter, chart recorder and DC to AC con-verter. Circle No. 8 for full details.

LOW FUEL CONSUMPTION: Just one of the many features pointed out by Inger-soll-Rand in a new 20-page bulletin is how low fuel consumption is obtained in the type S and SS Diesel engines through the use of diametrically opposed single ori-fice inflector nozzles which provide solid fuel injection. The bulletin covers en-gines from 375 to 1000 hp. Circle No. 9.

FEEDER BULLETIN: A recent bulletin by Fuller Co. of Catasauqua, Pa., de-scribes and illustrates a complete line of roll and vane-type feeders and roury valves. Bulletin F-5 can be obtained by circling No. 10.

DRILLERS HANDBOOK: Davey Com-DRILLERS HANDBOOK: Davey Com-pressor Co. has published a comprehensive manual known as "Drillers Handbook on Rock." The 68-page boklet contains a complete description of common rocks. A method by which the driller can establish a "point system" to figure drillability and drilling cost is outlined. Copies are priced at \$1.50 each and are available from Davey Compressor Co., Kent, Ohio.

MULTIPLIER TUBES for Geiger counters are now being manufactured by Nucleonic Company of America. They have a high sensitivity to gamma radiation, and can be attached to a low priced counter to obtain greater sensitivities. The directional characteristic of the tube enables quick orientation to the area producing the radiation. For complete details circle No. 11.

URANIUM EXPLORATION: A new 6-page brochure contains detailed, illustrated descriptions and costs of unique survey and research services rendered for qualified companies, individuals and government agencies by Research, Inc., Dallas, Texas. Circle No. 12.

VIBRATING SCREENS with stress-relieved decks which are riveted to high-tensile side plates are described in a Link-Belt Co. book No. 2554. Completely integrated, rigid box assemblies available with one, two, or three screen decks are described. Circle No. 13.

HARDFACING CATALOG: "Alloys for Hardfacing and Rebuilding" is the title of a 20-page Spanish-language booklet published by American Brake Shoe Co. Full technical and ordering information is given for all grades of Amsco rod and

wire as well as many other products. Circle No. 14 for a copy of the bulletin. NEW "W" SERIES DRILL RODS: The NEW W SERIES DRILL ROLD; are E. J. Longyear Co. recently announced a complete line of drill rods developed to the new standards adopted by the Diamond Core Drill Manufacturers Asso-Diamond Core Drill Manufacturers Association. The new "W" series will come in EW, AW, BW, and NW sizes. The change over will be gradual. In the meantime, the company will manufacture the old standard E, A, B and N rods. Circle No. 15 for details.

POWER TRANSMISSION: W. A. Jones Foundry & Machine Co. has released the first in a series of bi-monthly publications devoted to the application of power transmission equipment to meet today's industrial needs. They will be glad to send a copy to any interested reader. Circle No.

SECONDARY CRUSHERS: In many SECONDARY CRUSHERS: In many ways, secondary crushing is more important to profitable ore production than the primary reduction. Bulletin 7112, published by Traylor Engineering & Manufacturing Co., fully describes the secondary crushers which they manufacture. Circle No. 23 for your copy.

ONE USE ROCK BITS: Bulletin RD-29 gives detailed information on Cleveland Rock Drill Division's one-use rock bits. The manufacturer claims faster drilling speeds and less drill steel breakage for the tapered, threadless CRD bit. Obtain full particulars by circling No. 24.

CORE DRILL: Acker Drill Co., Inc. have developed a new, compact, rotary core drill known as the Teredo. The Acker Teredo fills the need for a simple, rugged drill of medium capacity for depths to 500 or 600 feet. The self-contained unit is furnished with either a hydraulic or screw feed. Circle No. 36 for details.

ANALYSIS: Edmund Scientific Corp. has developed a new instrument for soil analysis, The Edscorp Geological Sand Measuring Magnifier is designed to measure, count and compare sand par-ticles under magnification. Circle No. 37.

HYDRAULIC CLASSIFICATION: The Dorroo Jet Sizer, manufactured by Dorr-Oliver, Inc., is a completely re-designed unit reported to make more effective use of hydraulic water to produce clean de-slimed fractions sized within narrow lim-its. If you'd like more information on the Jet Sizer, circle No. 54.





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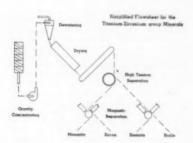
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Quick-Way to Exhibit at Japan International Fair

Following up its success at the Trade Fair in Osaka last year, the Quick-Way Truck Shovel Co. of Denver again ex-Truck Shovel Co. of Denver again exhibited at the Japan International Trade Fair which was held in Tokyo May 5th to 18th. On display was the Quick-Way model S 3 having % cubic yard capacity. For more information on the S3 circle No. 73.



Carpco High Tension and **Gravity Mineral Separation**

Flowsheets similar to the above are Flowsheets similar to the above are used to recover cassiterite, chromite, garnet, scheelite, staurolite, wolframite, and many others using high tension and magnetic separators designed and constructed by Carpeo Engineering and Manufacturing. Carpeo also maintains a complete laboratory and pilot plant and will carry out tests to demonstrate the suitability of their equipment for your use. To find out how Carpeo can help you with your milling problems circle. you with your milling problems circle No. 65.



A-C HD-21 Largest, Most **Powerful Crawler Tractor**

The biggest and most powerful crawler tractor ever put into production is coming off assembly lines at the Springfield plant of the Allis-Chalmers Manufacturing Company. The new HD-21 was designed to meet the changing demands of jobs to meet the changing demands of jobs that require a tractor with more power, longer life and the ability to operate at a lower cost per unit of work. Weight of the tractor is 44,000 pounds. It develops 204 horsepower at the flywheel and will offer the high-output torque converter drive as standard equipment. Among its many new design features are: a new power work of the converted of the conver high-capacity cooling system, new master clutch, new transmission, new tru-dimension track, new wrap-around radia-tor guard and the new A-C Diesel engine. For additional data on the HD-21 circle



Brunner & Lay Introduce New X-Ray Rock-Bits

Designed for use on the new larger machines, Brunner & Lay, Inc. offers the X-type, tungsten-carbide Rock-Bits. They are available in 3%, 4 and 4%-inch gauge sizes, to fit on 1% and 2-inch drill rods. These bits are now made to fit directly on the steel of two machines, eliminating the use of expensive adapters. The X-type Rock-Bits feature a new body design and new job-fitted carbides, the manufacturer points out. Descriptive bulletin B-1 is available from Brunner & Lay by circling



Light-Weight Plastic Pipe for Handling Mine Water

During the last four years the National Tube Division of United States Steel Corporation has conducted research on the development of plastic pipe for use in unwatering mines. The result is a new plastic pipe that is light, flexble, and ex-tremely corrosive resistant. A 200-foot coil of this 2-inch pipe weighs only 86 pounds. Flexibility of the pipe allows it to be installed to meet almost any contour of the mine. The smooth inner wall minimizes the accumulation of deposits and aids in corrosion resistance. If it is neces sary to make joints in the pipe, simple insert fittings and stainless steel clamps permit coupling to be accomplished easily and quickly. To learn more about how this new plastic pipe can save you money circle No. 69.

Notes From The Manufacturers

MAYER G. HANSEN. senior geologist with the E. J. Longyear Company, will be in charge of a new consulting opened by the firm in Denver, Colorado. Special emphasis of the new office will be on uranium appraisals and mining activities on the Colo-

clude photogeological surveys from aerial maps, geological and mining engineering consultations, and mine development. Assisting Mr. Hansen at the Denver office will be



rado Plateau. Services of the company in-GEORGE MURRAY, mining engineer.

Sauerman Bros., Inc., have moved their general offices to 620 S. 28th Avenue, Bellwood, Illinois. The new office building is adjacent to their Bellwood plant and provides enlarged facilities for all departments.

Several personnel changes have been announced by the Engineering departannounced by the Engineering depart-ment of Jeffrey Manufacturing Company, Columbus, Ohio. Harold C. Medley, manager of the Conveying Research and Development Section, assumes the position of chief engineer of the Conveyor Divior chief engineer of the Conveyor Divi-sion. Arnie J. Kindig has been appointed to replace Mr. Medley. New chief en-gineer of the mining division is Morton B. Curley, previously assistant to the vice president in charge of engineering. John Beltz, division chief engineer, has been moved into the newly created post of chief consulting engineer to the mining division.

division.

Pacific Wood Tank Corporation, San
Francisco, California, has been appointed
representative for Pennsylvania Salt
Manufacturing Company of Philadelphia in northern California and western Nevada. They will handle the sale of chemical resistant cements, linings and coatings.

Howard S. Bunn, Union Carbide and Carbon Corporation, has been elected executive vice president and member of the executive committee. He has been with Union Carbide since 1922 and became vice president in 1953.

precipitates—ROCKY MOUNTAIN-

Vitro Minerals Ships Ore From Gas Hills Claims

The first truckload of uranium ore was shipped April 24 by Vitro Minerals Corporation from its properties in the Gas Hills area of Fremont County, Wyoming to the AEC buying station at Riverton, Wyoming. The ore was produced from the 14 Gunnel claims owned by the Fremont Metal and Mining Company of Lander, Wyoming and operated by Vitro Minerals under joint ventureship agreement through which the Lander concern furnishes the claims, Vitro the produc-tion, and net profits are split equally.

Shipment was made from a stockpile of about 100 tons from which assays averaged 0.27 percent U₂O₈. Preliminary surface work and test drilling have dissurface work and test draining have tas-closed two ore horizons of as yet un-known extent, and drilling is continuing. Doing the mining and stripping is the two-cubic-yard dragline and bulldozer,



pictured in the accompanying photo. This dragline was moved into the claims re-cently by the Rochester & Pittsburgh Coal Company, joint operator in Vitro
Minerals with Vitro Corporation of
America. Standing by the machine is
Premo Calabaria, who came along with the dragline when it was shipped during the winter from a strip coal mine east of Pittsburgh, Pennsylvania. The dragline is parked over a portion of the blocked out deposit, which is about seven feet below the surface. Suitability of the terrain for strip mining may be noted in

the picture.
A monthly production rate of 2,000 tons on this and adjoining claims was expected to be reached by the first of June. A crusher will be installed to prothe sandstone ore and to permit blending to maintain the most profitable shipping grade, which has been com-puted as between 0.22 and 0.23 for an average Gas Hills operation.

U & I Shareholders Vote To Join Federal Uranium

Shareholders of U & I Uranium, Inc., Kellogg, Idaho, have decided to merge the company's Radon and Hot Rock properties in San Juan County, Utah, with Federal Uranium Corporation. A thorough investigation of the proposed concommittee before the decision was reached. The board of directors earlier had voted to merge with Federal. One share of Federal was exchanged for each 12% shares of U & I under the agreement. Other U & I holdings, including the Rocket group in Crand County and other Utah properties, will be retained by U & I shareholders, and placed in another corporation. (See page 35, April 1955, MINING WORLD, for more details on U & I's entrance into Federal Uranium.)

Ruddock Uranium Interests Sold for \$10,000,000

Sale of the Ruddock uranium interests in San Juan County, Utah to a Utah and Wyoming syndicate for what is believed to be in excess of \$10,000,000 was anmounced late in April. Purchasers include Maurice Yates of Salt Lake City, H. O. English of Casper, Wyoming, and a group of Hollywood film stars.

The cash sale involves 785 claims in the Big Indian and Moab areas, held by Almar Minerals Company and Cal Ura-nium Company, both of which are con-trolled by A. B. Ruddock, southern Cali-fornia financier and president of the California Institute of Technology board of trustees, and his sons, Billingsley and Merritt K. Ruddock of Denver, Colorado and Moab, Utah.

The transaction includes Cal Uranium's San Juan Shaft in Lisbon Valley where a recent report indicated that an ore reserve of 3,750,000 tons had been es-tablished. Cal Uranium is one of the early major producers of uranium ore in the county's Big Indian district. Almar Minerals Company, in which the Rud-docks have a 51 percent interest, con-trols the Daniel and Ruddock claims. Most of the remaining interest is held by the new Federal Uranium Corporation.

Completion of the transaction marks the largest uranium sale to date, topping the purchase of Vernon Pick's mine by Atlas Corporation last year for \$9,000,-000. The Ruddock family intends to stay in the uranium field and currently has an active exploration program underway.

Colorado Uranium Division offices of the J. R. Simplot Company have been moved from Norwood, Colorado, to Grand Junction. Manager of the office is Phillip T. Peterson, and staff geologist is Richard Zitting

Sinclair & Hildreth Mines, Inc., Kansas City, Missouri, reportedly is setting up uranium headquarters in Gunnison, Colorado. The company is believed to have moved in a complete research and exploration department to aid in the development of uranium properties.

Newest of the uranium associations on Newest of the uranium associations on the Colorado Plateau is the Uranium Drillers Association of America, which has been meeting in Grand Junction, Colorado. Richard Travis, of the Dawn Colorado. Richard Travis, of the Dawn Drilling and Mining Company, has been named president of the group. Jack Rigg, Minerals Engineering Company, is vice president. Purpose of the group is to set drilling standards for the uranium industry and to act as a clearing house for unclassified information on uranium recentification. operations.

Crescent Uranium Mines, Inc. has recrescent Uranium Mines, Inc. has reported that an amenability test on 10.920 pounds of ore obtained from its claims near Canon City, Colorado, showed an average assay of 0.90 percent U_sO_s and 0.49 vanadium. The ore was obtained by stripping methods on the property. Crescent has 65 uranium claims under lease in the area. lease in the area.

Molybdenum production at Climax Molybdenum Company, Climax, Colo-rado rose to 42,544,795 pounds in 1954, rado rose to 42,544,795 pounds in 1994, an increase of 5,000,000 pounds over 1953. Tungsten, a byproduct at the operation, reached a new high of 632,000 pounds. The company is engaged in several uranium ventures, in addition to operations by the affiliated Climax Uranium Company, and an exploration program is planned for the firm's property in Valencia County, New Mexico, which is owned with St. Anthony Uranium Corporation.

Davis Industries. New York City firm. is planning to open a branch office in Grand Junction, Colorado to supervise its mining division. The company, which also is engaged in home building, hotel operations, and oil activities, is presently drilling for uranium in the Monogram Mesa area of Montrose County, Colorado. Representing the Davis interests in Grand Junction are Harvey W. Smith, mining engineer, and Philip V. Doyle, geologist.



Plans are now underway to form an association of radiation detection equipment manufacturers on the Colorado Plateau. T. R. Gillenwaters, industrial counsel for *Uranium Engineering Com*counsel for Vanium Engineering Com-pany, Grand Junction, Colorado, in call-ing for formation of the group hopes that certain standards can be set up for manufacturers of detection equipment. Organizational meeting was scheduled during the Uranium Ore Producers' Association exposition in May.

Remodeling work at the mine and mill of Telluride Mines, Inc., Telluride, Coloor returned mines, inc., Telluride, Colorado, is progressing according to schedule. Target date for completion of the mill is October 1, and full production is expected by January 1, 1956. The company will cease generating electricity and will buy power from Western Colorado Power Company. Warehouses are being built underground, and a new 60-pound track will replace the old 40-pound rails.



A contract covering the construction and operation of a uranium ore process-ing mill located at Edgemont, South Dakota, has been signed by the United States Atomic Energy Commission and Mines Development, Inc., Denver, Colo-rado. Construction is to begin promptly, rado. Construction is to begin promptly, with completion scheduled in about ten months. Western Knapp Engineering Company has contracted to do construction work. The new mill, to be owned and operated by Mines Development, Inc., will provide processing facilities for the uranium ores of the Black Hills region. Approximately 100 men will be employed at the plant when it is completed. pleted.



Cornucopia Gold Mines, Spokane, Washington, has started work on its 65-claim group in Millard Canyon, Wayne County, Utah. Exploration also is to start soon on 46 claims in the San Rafael Swell area of Emery County and on the 48-claim *Bow Knot* group, Emery Coun-ty. Carl M. Stolle, Spokane, is president.

United Western Minerals Company, Santa Fe, New Mexico, expects that the former McNary claims which it has ac-quired in the Circle Cliffs area of Utah will be in production by the middle of this month. The company holds approximately 36,000 acres of uranium-vana-dium leases, permits and claims on fed-

eral and state lands, including a producing mine in the Henry mountains. Moab Mines, Inc., Moab, Utah, has announced two exploratory drilling proannounced two exploratory drilling programs on its uranium properties in the Blanding and Uravan areas. A drilling contract was signed between William J. Owen, president of Moab Mines, and El Paso Uranium Company for work on the Juanita and Beve claims four miles south of the Abajor Mountains, and op-erations are now underway. Three ore shipments have been made and addisimplified have been made and additional drilling is planned at the *Lucky Nine* mine on Wray Mesa in the Uravan Belt. Two thousand tons of uranium ore have been blocked out to date on three acres of the company's 80-acre lease.

In drilling on its claims at Kanab, Utah, Standard Mining Corporation made news in April by striking two wells with a flow of 150 gallons of water per minute. This is in an area where no other water has been found within a radius of some 30 to 40 miles. The firm also encountered a mineralized zone showing 9.9 percent zinc, 4.5 percent lead, 0.1 germanium, and 0.02 uranium.

Continental Uranium, Inc., Grand Junction, Colorado, is applying for an AEC contract to build a 200-ton-per-day uranium ore processing plant near Moab, Utah. License arrangements have been made on the Burwell process of treating uranium ores, and it is believed that pro-duction could be achieved in six months

after breaking ground.

New Park Mining Company, Salt Lake City, Utah reports a net income of \$107,-371.78 for the year 1954 compared with \$39,456.32 for 1953. Gross income from sales of lead-silver-zinc-copper-gold ores from its Park City mine amounted to

from its Park City linus \$2,041,293.12 last year.

The boards of directors of Standard Uranium Corporation and Big Indian Mines, Inc. have approved a merger of Miles, Inc. have approved a merger of Big Indian into Standard subject to ap-proval by stockholders of the two corpo-rations. Basis of the exchange will be six shares of Standard for each share of Big Indian. Big Indian Mines, Inc. is the owner of a one-half interest in mining properties in the Big Indian district, San Juan County, Utah, with seven un-patented mining claims.

United Park City Mines Corporation, Salt Lake City, Utah, reports that it has cut its losses and is developing slightly more than one ton of ore reserve for each ton mined at its Park City district, Summit County, Utah operation. Net loss

during 1954 amounted to \$182,995 compared with losses of \$202,757 from May to December 1953. Production at the mine, which resumed operations last year after a 2½-year shutdown, had been built up to 260 dry tons a day by December The firm produced 19,326 dry tons of ore, containing 736 ounces of gold, 82,165 ounces of silver, 3,093,627 pounds of lead, 4,007,468 pounds of zinc and 39,005 pounds of copper during 1954.

Part of the Monticello, Utah United States Atomic Energy Commission station's stockpile of uranium buying ore will be transferred to the Kerr-McGee Oil Industries, Inc. processing mill at Shiprock, New Mexico. It is expected to take about a year to complete the hauling of the ore, under a contract

signed with George Smith, Jr., a Cortez, Colorado trucker.

Big Horn Uranium Company, Salt Big Horn Uranium Company, Salt Lake City, Utah has signed a contract with Newam Company, Vancouver, British Columbia to drive a 1,800-foot tunnel through Big Horn property for exploration on claims in the Jolly Jack group. Pioneer Gold Mines Company, of which the Canadian company is an affiliate, has an interest in the Jolly Jack group. Big Horn will share use of the tunnel and any ore encountered by Neyan in driving through Big Horn's holdings will be stockthrough Big Horn's holdings will be stock-piled to the firm's account. The properties are adjacent to Cooper and Bronson's Happy Jack mine and are the subject of search for extension of the Happy Jack ore



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Plans for the development of the uranium potential on the Wind River Indian reservation in Wyoming are now being drawn up by attorneys for the Arapahoe and Shoshone tribes. A recent meeting was held by the agency representatives to discuss possible opening up of the reservation to uranium activity. It is not known yet whether the reservation will be opened to prospecting and leasing by individuals or whether a bonus bid-leasing system will be used. The Joint Council emphasized that it is desirous of setting up well-organized uranium exploration procedures to provide the greatest benefits to the tribes and individual prospectors.

Onego Corporation, Uniontown, Pennsylvania, has purchased 149 uranium claims in the Sand Draw area of Fremont County, Wyoming from a group of Fremont County residents. The corporation paid \$59,600 for the leases. Onego Corporation, which has extensive oil holdings in the eastern United States, recently began uranium production in New Mexico. In addition to the Sand Draw purchase, the firm is negotiating for acquisition of leases in the Gas Hills area.

The House Subcommittee on Special Government Activities has been holding hearings in Washington, D.C. on the recent sale of the government-owned alumina processing plant at Laramie, Wyoming to Ideal Cement Company. Last year the General Services Administration concluded the transaction with Great Western Aggregates, Ideal subsidiary, for a purchase price of \$1,200,000. Monolith Portland Midwest Company, Los Angeles, California, has charged that the GSA had indicated that they, as former operators, would be able to purchase the plant. Since negotiations between the GSA and Ideal Cement were completed, the plant has been operated for the production of lightweight aggregate. Ideal has indicated that plans are underway to convert part of the plant to the reduction of titanium and uranium ores.

Secretary of the Interior Douglas Mc-Kay cancelled an order that would have returned 65,000 acres in the Pumpkin Buttes area of Wyoming to the public domain early in May. The cancellation came at the insistence of Governor Milward Simpson and Bureau of Land Management officials who feared an outbreak of violence if hundreds of uranium prospectors were allowed to stake claims in the area. Much of the land is leased to ranchers who hold surface rights for grazing. Reports from the area showed that many of the ranchers were concerned about the expected land scramble because of destruction to their fences, waterholes, and livestock. To prevent any violence state law enforcement agencies and the National Guard reportedly were increasing their vigil over the region.

The Double O Timber and Mining Company, San Francisco, California, has acquired 40 claims in the Crooks Gap area of the Gas Hills mining district in southwestern Wyoming. Al Simrak is general manager and treasurer.



WITHOUT DOWNTIME

L. F. Barber, chief mining engineer, Goodnews Bay Mining Co., writes:

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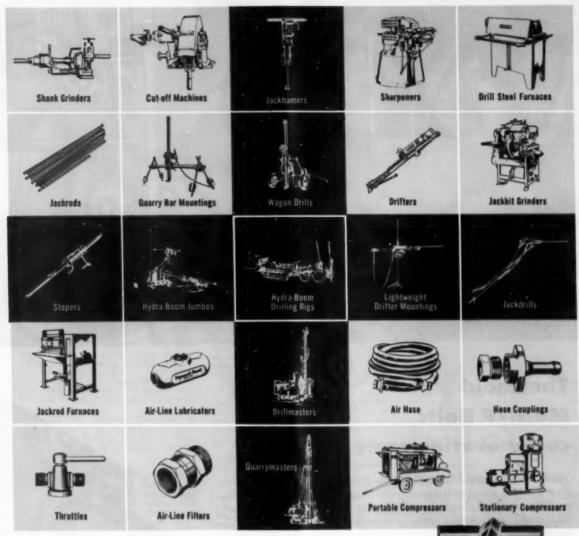


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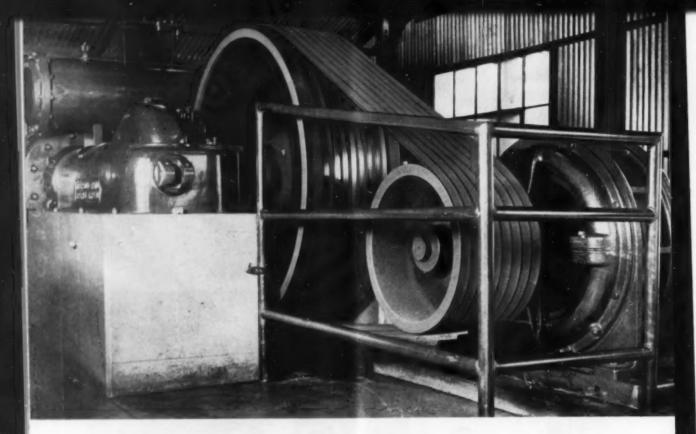
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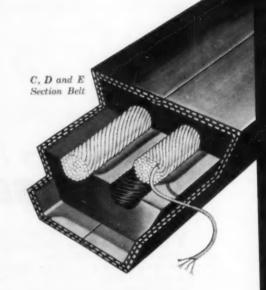


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the Crescent mine, Shoshone County, Idaho, silver-copper ore has been found 2,000 feet below any previous production. The discovery was made on the new 3,200-foot level after deepening of the mine shaft from the 1,200 level. The ore occurs along a fault which has the downward projection of the Alhambra fault, the ore-bearing structure on upper levels. At last report, more than 100 feet of ore had averaged about 30 ounces of silver per ton over an average width of about 4% feet. This is a better grade than that mined on upper levels before the mine was shut down in World War II. The mine has been rehabilitated and deepened over the last two years under a \$1,098,750 contract with the under a \$1,098,750 contract with the Defense Minerals Exploration Administration. The mine is owned by Bunker Hill & Sullivan Mining and Concentration. ing Company. John D. Bradley, Kellogg, is president.

At the other end of the Coeur d'Alene mining region's Silver Belk, American Smelting and Refining Company has opened silver-copper ore on the new 3,-400-foot level of the Galena mine west of Wallace, Idaho. The vein looks about the same as on the 3,000 level where it was discovered in February 1953. Production is running about 350 tons daily. ASARCO is operating the mine under long-term lease from Vulcan Silver-Lead Corporation, a subsidiary of Callahan Zinc-Lead Company. Day Mines, Inc., Wallace, has a 25 percent participating interest in the lease.

Lewis-Clark Uranium Company at Kamiah, Idaho, has applied for a gold and monazite lease on the St. Joe River at Simmons Creek, Shoshone County, Idaho.

Hecla Mining Company is well along with preparations for sinking a 2,080-foot shaft for deep development of the consolidated holdings of Silver Mountain Lead Mines, Inc., east of Mullan. The three-compartment shaft will be in Daisy Gulch, near the site of the old Snow-storm mill. The Snowstorm was an early-day copper producer. Buildings completed or under construction include a miners' change room, shop and office building. The \$1,058,370 DMEA project will be carried out jointly by Hecla and Bunker Hill & Sullivan, with Hecla as the operating firm.

In the Silver Syndicate mine, in the Idaho Silver Belt, Sunshine Mining Company has encountered a narrow but encouraging new vein of silver-copper ore. The showing was found in drifting easterly parallel to the Syndicate fault structure on the 3700-foot level, about midway between the East and West Rembo stoping areas. The vein angled toward the fault. Production from the Syndicate zone is being increased. W. M. Yeaman, Yakima, is president of Silver Syndicate, Inc.

Sullivan Mining Company's electrolytic zinc plant near Kellogg, Shoshone County, Idaho is operating at capacity and its adjacent sulphuric acid plant was stepping up production at last report. The acid plant, placed in operation early last year, was shut down last August be-

cause of insufficient sales. It resumed operations in February of this year. A planned increase of output from 75 tons to 100 tons daily would bring the operation to about 40 percent of capacity. Sullivan's Star zinc mine at Burke was operating at 95 percent of capacity at last report. The Sullivan firm is owned jointly by Hecla Mining Company and Bunker Hill & Sullivan Mining and Concentrating Company.

Bunker Hill & Sullivan's fuming plant at its lead smelter, Kellogg, Idaho, was heavily damaged by fire recently. Temporary repairs put the plant back into operation within a few days. Fifty men are employed at the two-story plant. The nearby Bunker Hill mine has won Idaho's top safety award for class A mines for the second consecutive year.

Day Mines, Inc., Wallace, Idaho, is opening a promising ore shoot on the new 1,600-foot level of the Hercules mine at Burke. The shoot was found by additional tunneling westerly on the vein. East of Mullan, Day Mines is nearing completion of rehabilitation of the old 1,200-foot Gold Hunter mine shaft. Less than 100 feet remains to be retimbered. The new 1,100-foot level of the Dayrock mine, near Wallace, has intersected the vein which appears to be the same as above. Henry L. Day, Wallace, is president and manager.

At the Silver Belt property of Sunshine Consolidated, Inc., Sunshine Mining Company currently is mining more than 2,000 tons of ore monthly. This is at an annual rate of about 26,000 tons, compared with 1954 output of 19,201 tons. Silver recoveries in 1954 averaged about 40 ounces per ton, About 300 feet of ore were opened on the new 3,400-tot level and additional new ore on the 3,100 level. Efforts this year will be on extending the 3,100 west drift into unexplored ground, with the Alhambra fault as the main immediate objective. W. M. Yeaman of Yakima, Washington, is president.

Clayton Silver Mines has increased ore reserves about 4,000 tons by development work so far this year at its Custer County, Idaho property. The South ore body currently is being opened on the new 550-foot level. The larger North ore body is expected to be reached by July. Eighteen men are producing about 100 tons of ore daily—the milling capacity. W. M. Yeaman, Yakima, is president.

Polaris Mining Company's East exploration contract with the DMEA has been revised to provide for 15,000 feet of diamond drilling into walls of the two-mile drift it is driving in the Silver Belt of the Coeur d'Alene mining region, Shoshone County, Idaho. The project originally called for 5,000 feet of coring. The drift from the 3,000-foot level of the Silver Summit mine has been advanced more than a mile.

Metropolitan Mines Corporation, Wallace, Idaho, has reopened the caved adit portal of the old Black Bear mine in Burke Canyon and is retimbering old workings. Lead-silver-zinc ore left in raises and stopes is being inspected and maps brought up to date. Metropolitan is taking stock of Black Bear Silver-Lead Company for the work which is intended to get the property back on a producing basis. Roy Kingsbury, Wallace, heads Metropolitan.

Fortune Mining Company, Eastern Lead Corporation, Inc., Silver Buckle Mining Company, all of Wallace, Idaho, and Pathinder Uranium, Inc., a Colorado Plateau operator, have combined to search for uranium in the Idaho Panhandle. Each firm will contribute 14 sections of state mineral leases to the project and each will share equally in any ore discoveries made on any of the sections. The leases total 35,000 acres, and are east, northeast, and southwest of the Dahl uranium strike recently made in Spokane County, Washington, Dr. F. E. Scott is president of the Wallace firms.

Newmont To Develop Midnite Uranium Mine

Newmont Mining Corporation of New York City has taken over exploration and development of the Midnite uranium mine on the Spokane Indian Reservation, 60 miles northwest of Spokane, Washington and will spend \$125,000 as a starter. The New Company will be formed, with Newmont holding 51 percent interest and Midnite Mines, Inc. 49 percent. Spencer Hinsdale of Portland, Oregon, a director of the Newmont subsidiary-Idarado Mining Company of Ouray, Colorado, will be president of New Company, and Robert J. Hundhausen who has been with the U.S. Bureau of Mines at Spokane, will be general manager. Midnite Mines is controlled by John and James LeBret, shown above at the site of their original uranium discovery, and their uncles Clair, Thomas, and John Wynecoop of Wellpinit. All are members of the Spokane tribe of Indians. Preliminary drilling for geological purposes by the Atomic Energy Commission has indicated a deposit of more than 100,000 tens.



Ore had been found in 9 of the 10 holes completed, according to the last available report. A total of 700 tens had been shipped to a Salt Lake City processing plant by Midnite Mines. The ore average 0.285 percent uranium oxide, and was mined by benching. The ore zone has been proven for about one-half mile. Radioactivity has been found for 134 miles along the granite-orgilitie contact.

Among the mining firms recently incorporated in Idaho were the following: White Cliffs Uranium Corporation of Idaho Falls, by Roy C. Varnes, Parley Rigby, and Edward B. Clark, Bozeman Uranium Exploration Corporation at Boise, by Carlo Lo Conto, W. C. Dawes, and James J. Hawley; Idaho-Necada Uranium Company at Albion, by Otto R. and Sarah M. Ward, C. E. Simensen, and M. C. Eldred. The latter firm plans to work uranium claims in Elko County, Nevada.

Elk Mining Company has been organized at Grangeville, Idaho. Frank W. Knehl is president; James K. Sproat, vice president; and J. D. Chapen, secretary and general superintendent of mining. The firm is undertaking gold placer operations on Newsome Nugget and Sawmill Creek near Elk City, Idaho. Mining is done with a one-cubic-yard dragline and D-7 Caterpillar tractor. The gold-bearing gravel is concentrated in a dry land washing plant which has a capacity of 1,500 cubic yards daily.

Urgnium Prince Mining Company has

Uranium Prince Mining Company has been incorporated by R. J. Bruning, Piatt Hull, and La Vaun Christensen of Wallace, Idaho. The firm is capitalized for 10,000,000 shares of 5-cent par value

Intermountain Development Company has been formed by Clinton R. and Mary F. Rupp, Wayne G. Taylor, and Lyle Leslie of Pocatello, Idaho to mine uranium and other minerals.

A uranium discovery is reported on Williams Creek, five miles southwest of Salmon, Idaho. The claims have been staked by Ed Sargent and G. I. Hurley. Other strikes have been made along Patee Creek, in the Gibbonsville area, and along Tenmile and Twelvemile Creeks.



The huge gold dredge north of Helena, Montana, which has been idle for the past five years, is being dismantled for shipment to Boise, Idaho where it will be used for dredging of uranium-bearing sands.

Mammoth Lode and Uranium Exploration Corporation of Helena, Montana has been incorporated with capital stock of \$500,000. Directors are Clifford S. Johnston, Helena; Ray Middlesworth, Shelby; Charles Reed, William J. Martin, David R. Jones, Ames Iverson and Albert W. Park, all of Conrad, and Andrew Anderson, Cut Bank.

Exploration Corporation of Great Falls, Montana has been formed by Elton W. Good and E. G. Onstad of Floweree and V. R. Chamberlain, Great Falls. Capitalization was \$100,000.

American Chrome Company is somewhat ahead of schedule under its contract to supply the government with 900,000 tons of chromite concentrates in eight years. The firm has produced more than 171,000 tons of concentrates since it started operations in August 1953, at the

Mouat mine at Nye, Stillwater County, Montana. John Bley is manager.

Canyon Uranium Company has been incorporated for \$300,000 by E. O. Reickhoff, Havre; E. C. Ecklesdafer, Missoula; Henry E. Barton, Clancy, and George McGaffick, Helena.

GeoChem Development Company, Butte, Montana has been incorporated at \$1,000,000 by Leona Sullender, Louise Clemo, and A. O. Hill, all of Butte.

Clemo, and A. O. Hill, all of Butte.
Roger F. Little and Robert A. Little of Missoula and George T. Croonenberghs, Philipsburg, are developing a radioactive ore showing on ground adjoining the Brooklyn mine in Granite County's Philipsburg area, Montana.



Eight claims near Wimer, Jackson County, Oregon have been leased by Uranium Enterprises of Spokane, Washington, for uranium and thorium prospecting. They were located by Dewey Bristow of Grants Pass in the May Creek Shift which formerly yielded gold and silver from acid dikes in a triassic formation. R. C. Bartlett is president of Uranium Enterprises.

Owners of the Nickel Ridge claims on Rough and Ready Mountain, Josephine County, Oregon have started shipping

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The U.S. Atomic Energy Commission has loaned the Oregon State Department of Geology and Mineral Industries radio-assayers for use in its Baker field office. The department has been using one of the instruments in its Portland office for more than a year.

A test shipment of crushed limestone has been made by Chemical Lime Company of Baker, Oregon from its property on Marble Creek to the Nyssa plant of Amalgamated Sugar Company. The Marble Creek deposit has lain idle since Baker's pioneer days, when it was a source of burned lime.

D. A. Temple is mining rough blocks of varicolored volcanic tuff from the Rainbow Rock quarry near Pine Grove, Wasco County, Oregon, and shipping it to a Grants Pass stone-sawing and finishing plant operated by M. W. Parker.



Granore Mines, Ltd., United States subsidiary of Granby Consolidated Mining, Smelting and Power Co., Ltd., is preparing to start exploration of the Index copper property in the Sultan mining district, Snohomish County, Washington, under a leasing arrangement. A DMEA drilling project is estimated to cost \$120,000.

Daybreak Uranium, Inc. has started development work at the Dahl uranium discovery near the northwest base of Mount Spokane, Spokane County, Washington. First project was to bulldoze drilling sites for the U.S. Atomic Energy Commission. Daybreak Uranium succeeded Evergreen Uranium as the operating company, James W. Fox of Greenacres is company president; Thomas S. Smith of Opportunity, vice president; Kae Sowers, also of Opportunity, is secretary-treasurer.

Morning Sun Uranium Company has been organized by Logan Jorgens of Opportunity, Washington, and associates to explore three 80-acre tracts of state land just east of the Dahl farm. The ground was leased from the state by the Dahl family.

Highnoon Uranium Mines, Inc., Newport, Washington, has been organized with a capitalization of \$50,000. Incorporators were Charles A. Pulford, Newport; Henry C. Felsman, Trentwood; Lawrence L. Felsman, Spokane: Francis W. Russell, Sunnyside: John F. Kessler, Lewiston, and Paul Pfrimmer, Coeur d'Alene. The firm is prospecting eastern Washington with two scintillator-equipped planes. It has leased several hundred acres in Pend Oreille County.

U & W Uranium, Inc.. Spokane, Washington, was incorporated for \$400,000 by Thomas J. Liuton, Opportunity mining man; Ralph A. Gering, Ritzville wheat rancher and oilman; and S. Everett Salter, Spokane. The firm has leased 63 acres near Mount Spokane and has purchased 1,000 acres south of Blanding, San Juan County, Utah, for prospecting.

Tungsten Uranium Mines, successor to Penticton Tungsten Mines, Ltd., has been adding to its Germania tungsten mine holdings in southwest Stevens County, Washington. It has leased mineral rights on the nearby old Silver Seal Mining Company property four miles northwest of the Midnite uranium mine on the Spokane Indian reservation. The transaction was with Maguesium Mines, Inc. of Spokane, headed by Lee Thorpe. Tungsten Uranium also has obtained prospecting rights on two tracts south of the reservation in Lincoln County and on some ground near the Dahl uranium discovery near Mount Spokane, Spokane County. W. F. Dequase, Colorado geologist, was put in charge of exploration.

Raymond K. Palmer and George C. Nichols, Spokane real estate men, have leased 160 acres of land 2% miles north of Mount Spokane, Washington for uranium prospecting.

Sidney Mining Company and Mascot Mines of Kellogg, Idaho, with producing zinc-lead mines in the Coeur d'Alene mining region, have entered the new uranium field in southwestern Stevens County, Washington. They have agreed to explore 21 claims located by Harold R. Crawford, Byrl T. Goodwin, and associates of Spokane. The claims adjoin state land leased by Phelps Dodge Corporation of Douglas, Arizona. The firms also obtained options on other claims of the locators.

Frontier Uranium, Inc., with extensive holdings in southern Utah, and American Silver Mining Company, with a property in the Silver Belt of Idaho's Coeur d'Alenes, have located a dozen claims north of the Spokane Indian reservation in southwestern Stevens County, Washington. The claims are adjacent to state lands leased by Phelps Dodge Corporation. Don Murphy, Eatonville, Washington, is president of Frontier.

Sherman Creek Uranium Mines, Inc., at last report, was preparing to start stripping and drilling its Columbia Mountain claims in the Sherman Pass area of Ferry County, Washington. Art Lane and Burl Fowler head of the company.

Diamond B. Uranium Company has been incorporated by Joseph S. Skorupski, Spokane, and Thomas A. Carter and Ruth A. Olbertz, both of Olympia.

Target Uranium Company of Spokane, Washington has been incorporated to explore a Colorado Plateau property. Charles H. Stoltz and O. L. Cline, both of Spokane, and W. F. De Quasie of Lakewood, Washington, were incorporators. Stoltz is secretary of Ottawa Silver Mining and Milling Company, which has a property at Slocan City, British Columbia.

Six Garfield County, Washington farmers left for Colorado to search for uranium. The men, who planned to pack into a remote area and be supplied by plane, were Bob Dye, Lawrence Brown, Elton Brown, Jack Wassard, Francis Morgan and his son, Burt.

Gold Syndicate Corporation of Spokane polled stockholders on the question of using treasury stock to acquire a uranium prospect and obtained approval. The successor to the First Thought Mine Corporation has an idle gold mine near Orient, Stevens County, Washington. Frank Lilly heads the firm.

Diamond Drill Contracting Company of Spokane, Washington has developed a gasoline-powered portable diamond drilling machine weighing 46 pounds with pump. Drilling pressure is supplied by means of a bar supported on one end by a steel rod held by an expanding anchor bolt.

Northwest Magnesite Company has increased production at its Chewelah, Washington magnesite plant to meet increased demand for refractory magnesite from the steel industry. Production was down 60 percent in 1954 from 1953. More than 200 employees currently are working the company's quarries on a two-shift basis, the concentrator one shift, and the reduction plant three shifts daily. Howard Ziebell is general manager.

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Inspiration To Spend \$3,600,000 for Expansion And Improvement of Arizona Copper Property

Inspiration Consolidated Copper Company has announced a \$3,600,000 expansion and improvement project for its property and plant at Inspiration, Arizona. Plans call for complete rehabilitation and rebuilding of the concentrator—taking out the old equipment and replacing it with new and modern machinery—and development of sufficient additional water supply to meet concentrator needs.

When renovations are completed, the concentrator will have a daily capacity of 16,000 tons. It will be used to recover the sulphide portions of the ore and thereby increase productive capacity of the Inspiration plant to about 85,000,000 pounds of copper a year. Production in 1954 totaled 68,822,810 pounds of cop-

Adoption of the dual metallurgical process, which involves leaching the ore followed by concentration, is scheduled to begin in about 18 months. The company estimates that by making possible the profitable treatment of lower grade ores, the change will add some 350,000,000 pounds of recoverable copper to its ore reserves.

ore reserves.

When production was started at Inspiration in 1915, the ore was treated in the concentrator. However, as operations continued, ore composition changed and the concentrator was closed in 1927. It was operated briefly in 1937 and again in 1944. The 10,000-ton leaching built in 1926-1927 has continued to serve the present of Inspiration up to the present.

Between 1915 and 1947, all production at Inspiration was by underground methods. In the latter year open-pit development in the Live Oak area was undertaken. In March 1948 the first ore was hauled out of the open pit. Since that time, the area of open-pit mining has been expanded to embrace the Thornton Pit as well as extensions of the Live Oak area. As pit production increased, underground mining decreased and was suspended completely in August

Exploration and development work at the Christmas mine continues to be encouraging. The mine is 45 miles south of Inspiration and was acquired under option from Riviera Mines Company (see MINING WORLD, May 1955, page 101, on February 1, 1954. Since then Inspiration has conducted an intensive program of underground drifting and diamond drilling, both underground and from the surface. This work has included 10,458 feet of diamond drilling underground, 9,418 feet of drilling from the surface, and approximately 4,053 feet of crosscuts on the eighth and ninth levels of the mine. Expenditures during the first quarter of 1955 were reported to have amounted to \$1178.763.

United Western in Big Uranium Consolidation

United Western Minerals Company of Santa Fe, New Mexico, has acquired all mining, oil, and gas properties of United States Uranium Corporation and Pueblo-Southern Corporation of Santa Fe, and Border Uranium Corporation of Pueblo, Colorado. An arrangement with J. H. Whitney Company and White, Weld and Company, New York City brokers, calls for a \$250,000 exploration program on United States Uranium's 62,500 acres in claims and leases.

United Western holds 500,000 acres in New Mexico; 36,000 acres in uranium-vanadium leases in Utah, including a producing mine in the Henry Mountain district; and 48,000 acres in unproved oil and gas leases in Utah and New Mexico.

Patrick J. Hurley, former United States Secretary of War, is chairman of the board, and Alva A. Simpson, Jr. is president and general manager.



The Uranium Corporation of America of Salt Lake City, Utah, has acquired the Suckerite mining claims, 33 miles north of Globe, Arizona, on Workman Creek in the Sierra Ancha Mountains. According to Dan Gurovich of Miami, Arizona, the claims were originally leased to the Sierra Ancha Mining Company by himself and six partners. The Sierra Ancha Mining Company, in turn, sold the leases to Uranium Corporation of America. Under terms of a new agreement with the purchasing company, Gurovich and associates received a substantial cash payment and will receive a 5 percent royalty, with a minimum royalty payment of 25 cents per ton of ore taken from the property. John S. White heads Uranium Corporation of America

The West End Opeteca Mines Company of Mesa, Arizona has taken over the old National quicksilver property, located in the Sunflower mining district of Maricopa County, Arizona, five miles north of Sunflower. Old workings are being opened up and retimbered, new ore bins being built, and roads improved. Recent production has run from 15 to 20 flasks of quicksilver monthly, recovered by hand retorting. A flotation plant with a daily capacity of 150 tons per day has been erected and is complete except for the concentrate filter. It is understood that the mill was designed for Arizona Cinnabar, George Cralg, manager, and that this company holds contracts to mill ore and old dumps. High-grade ore and concentrates will be retorted in small batch retorts. Nick Comereski is general manager for West End Opeteca. Other officials include Thomas H. Craig, president of West End Opeteca, and Robert T. Cass, secretary-treasurer of Arizona Cinnabar.

Preliminary plans have been announced for the reopening of the old Iron Cap mine in the Copper Hill district, three miles north of Globe, Arizona, as a possible source of uranium ore. According to Howard Gentry, Scottsdale, when the United States made a shipment of pitchblende to Madam Curie in Paris, 9 tons of the 120-ton shipment came from the Iron Cap. He also reports that material on the dump shows high radio-

activity. First work proposed by the new group is reopening the 1,200-foot Williams shaft, then an underground drilling program. Production from the Iron Cap, between 1912 and 1928, is valued at \$11,700,000, primarily in copper with some silver and gold. Associated with Gentry in the venture are Grant J. Pool, vice president of Airborne Exploration Company, Phoenix; R. E. Sutton, Dallas, president of Airborne; and W. D. Riddle, Dateland.

Ventures, Ltd., a Canadian firm with a branch office at Patagonia, Arizona, has contracted for a considerable diamond-drilling program for the Volcano, or Sunnyside, mine in the Harshaw district of Arizona. The drilling contract is held by Mines Exploration and Development Company of Tucson, Arizona. The Volcano has been under active development for more than a year and a number of shipments of copper ore have been made, principally from old workings and from development openings.

The Bagdad Copper Corporation, Bagdad, Arizona, has purchased a new 9-yard P. & H. electric shovel and 10 Model 30SL Dart trucks. The new unit has been put in operation stripping the hill to the northwest of the present pit to uncover an extensive area of known ore. Cost of the new equipment is approximately \$575,000.

A new exploration program has been started by the *Black Pearl* tungsten mine, operated by Edgar A. Scholz and J. H. Cazier, Bagdad, Arizona. The work will consist of a shaft 150 feet deep, to be sunk near the portal of the present adit, and 400 feet of drifting from the bottom of the shaft.

Airborne scintillation surveys made by Miami Copper Company in the Globe-Miami area of Arizona, have resulted in the staking of mining claims on over 6,000 acres of public lands open for mineral location.

Ray M. King of Dewey, Arizona has leased with an option to buy 12 patented claims, formerly known as the Beaumann mines, 6% miles east of Dewey. He has had to sink a winze 80 feet to get into the old workings, because the main Laura shaft is caved in at the collar. He reports that he is now cleaning out drifts and the main shaft preparatory to stoping. He also reports one 40-ton shipment to the International Smelting and Refining Company's smelter at Miami, Arizona which assayed 4.84 percent Cu and 0.2 ounce Ag. Owners of the mine are A. R. Brashear of Humboldt, Arizona and Philip E. Hoff of Idaho Falls, Idaho.

Shattuck Denn Mining Corporation's enlargement of operating facilities at the Iron King mine and mill in Arizona was, with minor exceptions, completed in 1954. The new No. 7 shaft was sunk to the 17th level and was connected on that and other levels with the No. 6 shaft. A primary crushing plant at the No. 7 shaft collar and a conveyor system to transport ore to the secondary crusher, were installed. Hoisting and crushing capacity at the new shaft are now considered ample. The mill capacity is now about 900 tons of ore per day, compared with 600 tons per day prior to the beginning of the expansion program. Total cost of the program was about \$900,000. During 1954, 179,484 tons were mined compared with 190,679 tons in 1953. However improved metallurgy and an increase in grade of ore mined maintained an operating profit.

Though the company mines gold, silver, lead, zinc, and copper, the principal product is zinc and the earning capacity depends mainly upon the price of zinc.



Verdi Development Company reports that it is ahead of schedule in its work to adapt the Beck gold mill to uranium ore processing. The mill would treat ore from the company's properties in the Rosamond area of the Mojave Desert, California. Verdi is reported to be negotiating with the AEC for contract prices on uranium concentrate.

The Lockwin Oil and Gas Company of Los Angeles has purchased six uranium claims in Inyo County, California for \$100,000. The claims were held by Mrs. Olive Cantlay and her son, Jack Meyer. The property is about six miles southeast of Grant, 24 miles south of Lone Pine, and is recorded as Green Veleet No. 1 to 12. Under terms of the sale, Mrs. Cantlay and her son receive \$500 and 10 percent of net smelter or mill returns. The company must start work immediately on construction of roads and mining of ore.

What is reported to be the third commercial shipment of uranium ore to leave California has been made by a group operating in the Castle Butte area north of Mojave, California. Dr. Richard Atkinson, acting as spokesman for the group, reports that some seven tons were shipped to the AEC buying station at Marysville, Utah. The group holds eight claims in the area, and plans to continue operations on an exploration level, locating the most desirable place to sink a shaft.

A group of servicemen from the Edwards Air Force Base have discovered uranium in Réd Rock Canyon 21 miles north of Moiave, California. Thirty-five claims have been staked and filed. The group of ten includes the base commander, Colonel Robert P. Foley, and the commander of squadron headquarters, Captain Curtis L. Foster, who is spokesman. They were originally searching for tungsten when they found highly fluorescent opalite. Samples from the vein indicate it is a mixture of carnotite and autumite.

Teekay Mines Inc. at Tracy, California is currently stripping the Ladd manganese mine. During 1954 27,000 cubic yards were stripped. Also during the year 6,740 short tons of manganese were mined underground, as compared with 23,687 short tons in 1953.

D & B Sulphur Company is now in operation north of Bakersfield, California where the company is processing about 40 tons of sulphur per day. The sulphur deposits for the mill are located in the Last Chance mining district of Inyo County. Brimstone Sulphur Company has contracted to carry on the sales work for the production company. J. B. Donathan and Curt Brown are associated in the Brimstone firm; Wes David and Wiley Brown are partners in D & B Sulphur.

Mugwump Mining Company, Inc., formed by Mr. and Mrs. Cecil T. Vivian, now has about 400 acres of land in the Alleghany mining district of Sierra

County, California. Since start of operations in October 1953, 650 feet of tunnel have been driven in the Muguump mine, and 80 feet raised; work is now concentrated in crosscutting the Blue Lead channel, a prehistoric river bed. The company estimates it has spent about \$60,000 on the project to date and may be nearing placer production. Mrs. Vivian is president of the firm.



The gold dredging operations of Natomas Company, 17 miles south of Battle Mountain, Nevada have been terminated after the breakdown of castings on the stacker. The company did not foresee a gold recovery sufficient to justify future operations for more than six months; this, coupled with the high cost of operation and the low price of gold, brought about the decision to shut down now. The dredge is being dismantled and will be sold or moved to another property. The company is currently seeking uranium near Moab, Utah.

A rich strike of silver ore has been made 30 miles south of Fallon, Churchill County, Nevada by Nevada Rawhide Mining Company at a depth of 100 feet. Gold and lead values also are present. Ore from the shaft is run over a screen into the bunker. Screenings are hauled directly to a smelter and bulk ore is milled into concentrate in a 10-ton pilot mill. The firm, organized in 1952 to develop a new prospect, is controlled by stockholders in Cheney and Wilson Creek, Washington Clarence Davis of

Chency is president; Ira C. Tester of Spokane and Fallon, is assistant to the president; Pete Erb is mine superintendent.

United Uranium & Oil Corporation of Denver, Colorado is diversifying its activities by developing the McCoy mercury mine near Battle Mountain, Nevada. A 100-ton kiln is under construction, and is expected to be in operation this summer. Open-pit mining will be at a rate of 100 tons a day, with recovery expected to run about six pounds of mercury to the ton. On this basis, the kiln is expected to produce about 220 flasks a month.

The American Lignite Products Company of Ione, California and Carbondale, Pennsylvania has leased the uranium claims of Mrs. Mildred Behm of Bishop, California for six months at \$300 per month. The claims are in the Black Mountain district of Mineral County, Nevada, and were located by Mrs. Behm when she was searching for tungsten. Someone happened to test some of her tungsten samples with a Geiger counter and disclosed the uranium. Laboratory tests by the AEC appear to confirm this. American Lignite is stripping the overburden and expects to sink shafts shortly.

A newly formed corporation, Battle Mountain Copper Company, has acquired the properties of Copper Canyon Mining Company through a long-term lease and plans to reopen the mine as soon as possible. Copper Canyon, a long-time producer, closed down in 1952 following the drop in prices of lead and zinc. The new operators plan to mine both the Copper Canyon and Copper Basin ore bodies with ore being trucked to the Copper Canyon mill which will be revamped. The mill will be enlarged to handle 500 tons of open-pit copper ore



Quicksilver Discovered Within City Limits

Discovery of quicksilver within the city limits of Redwood City, California was made recently by two boys on their way home from school. They took a sample of cinnabar are to their parents who, in turn, contacted M. B. Piggott of Piggott Projects, San Francisco. Mr. Piggott, impressed by the quality of the are, contacted Sterling Realty Company, owners of the property, and obtained permission to mine the ere. The photograph above shows a typical cut on the property. Several trenches have been cut into the vein structure which is 32 feet wide and of unknown depth. Ore occurs in a sandstone serpentine contact as cinnabar, metacinnabar, and native mercury. Assays of ore obtained at grass roots and in buildazed trenches varied from 12 to 48 pounds per ton. Further development work is in progress to determine the depth and mode of operation to meet city regulations. Since the voin may possibly extend into Stulsaft Park owned by Redwood City, permission of the city council is being sought to continue mining on that property.

per day. Also, an oxide leaching plant will be added to treat the oxide area.

The Active Uranium Corporation of Las Vegas, Nevada has filed claims totaling nine square miles in the area around Las Vegas.

An extensive drilling program will be conducted on the Blue Bird group of claims in the Belmont district of Nevada owned jointly by Red Hill Florence Mining Company and the Sandstorm Mining Company. Last year a 50-foot shaft was sunk, from which a 48-foot crosscut and 50-foot drift were explored. Some encouraging uranium showings have been located.

Recently incorporated in Nevada was Cal-Nev Mining and Development Corporation. The company plans to do extensive development work on claims in the Palmetto-Silverpeak district, and in other areas of Esmeralda County. Members of the corporation include: Dr. L. H. Glaser of Artesia, California; John W. Brooks of Long Beach, California; and C. C. Lilenquist, Ray Reed, and Elzo Smith of Dyer, Nevada. Cal-Nev Mining and Development Corpo-

Two recent mining negotiations have been completed in northern Washoe County, Nevada, Cimota Products of Boise, Idaho has purchased the McCulley sodium sulphate and nitrate property for \$120,000 with a down payment of \$20,-000, and operations will begin soon. In the Bald Mountain area, Curtis Mathews and William Miller sold their cinnabar claims to Mercumet Inc. of Sparks, Nevada. The firm is reported to be purchasing equipment for a metallurgical plant to be constructed in Washee County with rail point at Alturas, Cali-

fornia.

Northwest Radiation Company has staked 13 uranium mining claims near Mountain City, Nevada, and a group of claims near Tonopah. The Mountain City claims, at 7000-foot elevation, will be drilled first under present plans. Stanley O. Leland of Spokane, Washington heads

the firm.

the firm.

Recently incorporated in Nevada are the Lodestar Uranium Company of Virgin Valley in the Denio district, and Queen Ann Tungsten & Quicksilver Mine, Inc. Incorporators of the former are Verner E. Ruedy of Oswego, Oregon; Thomas R. Fyock of Portland, Oregon; and Alfred G. Ruedy of Oswego, Oregon, Incorporators of the latter are Herbert Henne of Winnemucca, Nevada; John M. Pellini, Joseph R. Palermo, and Harry A. Simons of Philadelphia, Pennsylvania.

The Frontier Syndicate of Fresno, California is reported to be staking claims in Esmeralda County, Nevada.



Mining operations have begun on claims of *Uran-Leum*, *Inc.*, in Sandoval County, near Cuba, New Mexico, according to an announcement by the firm's spokesman, Ben F. Hobbs, of Dal-las, Texas. Frank Barnard is consulting geologist for the firm.

The Tower Mining & Refining Company is reported to have paid \$75,000 for three manganese claims adjoining others they previously had near Socorro, New Mexico, and plan to move their mill from Truth or Consequences to a

nearby location.

Guy M. Shockley, general manager of the Caballo Manganese Company, reports finding a rich deposit of ore in the com-pany's No. I mine in the Caballo Moun-tain area south of Truth or Consequences, New Mexico. A pilot load of the ore was sent to Western Machinery Company of San Francisco, California for test purposes.

The Frost Geophysical Company of Tulsa, Oklahoma has opened offices in Albuquerque, New Mexico with D. M. Ferebee, formerly of Stanolind Oil & Gas Company, in charge. The company is doing uranium exploration work on 60,000 acres of New Mexican land in McKinley and Valencia counties, leased from the Breece Lumber Company of

Albuquerque.

Among some of the new mining firms incorporated in New Mexico recently are the following: Zuniga Mines, Inc. by Mines, Inc. by Strong, and C. R. the following: Zuniga Mines, Inc. by Douglas B. White, Earl Strong, and C. R. Altman, to operate in the Silver City mining district; Winmaro Uranium Corporation of Tucumeari by J. W. Williams and E. H. Ellis; Wood Mining Company at Albuquerque by R. C. Wood, G. E. Whitsett and E. J. Wood; Quay County Uranium Company by Jim Hudson and Wayne Bishop of Moab,

Kerr-McGee Oil Industries, Inc. reportedly employs uranium scouts in its Navajo Uranium Division to keep track of developments in the western uranium

fields. They operate similarly to oil scouts in seeking out new prospect areas, discoveries, and developments.



Climax Molybdenum Company is reported to have signed a contract with the M. A. Jaffe Associates of San Antonio, Texas for development of uranium-bearing leases held by the Jaffee group in Karnes County, Texas. The property is about 40 miles southeast of San Antonio and covers about 2,200 acres in the middle of the Tordilla Hill strike near Falls

Roy M. Hammond of the Hammond-Everly Engineering Company, Butte, Montana is conducting extensive engi-neering and geological work for Terlingua Mercury Corporation at Terlingua, Brewster County, Texas. Work will in-clude preparation of complete geological clude preparation of complete geological contour maps of both Fresno and Section 69 mercury properties. He will also evaluate other properties in the area un-der option to Terlingua for both mercury

and uranium possibilities.

Approximately 2,000 acres of phosphate land containing "almost commercial grade" uranium were sold to Shawano Development Corporation of New wano Development Corporation of New York City by Louis Egan and Frank C. Thomas of Dallas, Texas, for a consideration in excess of \$4,000,000. Samples from the property assayed by Research, Inc. of Dallas showed phosphate to contain 0.05, 0.07, and 0.09 percent U₂O₈. Another sample checked by the U.S. Bureau of Mines showed 0.13 percent U₂O₈. The ores will be refined through a new process developed by the Minerals Refining Company of Salt Lake City, Utah. Utah.

Aluminum Company of America will enlarge its aluminum smelting capacity in Texas by 65,000 tons annually. Construction has started on two new smelting pot lines at the Rockdale, Texas works, and one additional pot line at Point Comfort. This will increase Rockdale capacity by 45,000 tons of primary aluminum annually and that of Point Comfort by 20,000 tons. Total cost of both projects will be about \$35,000,000, and production is expected sometime during the second quarter of 1956.

In MINING WORLD's April issue we forgot to mention. in an article on American Chrome Company's Mouat concentrator, that Denver Equipment Company supplied the two 6- by 12-foot rod mills used in the grinding section. Our apologies to all concerned for the slip.



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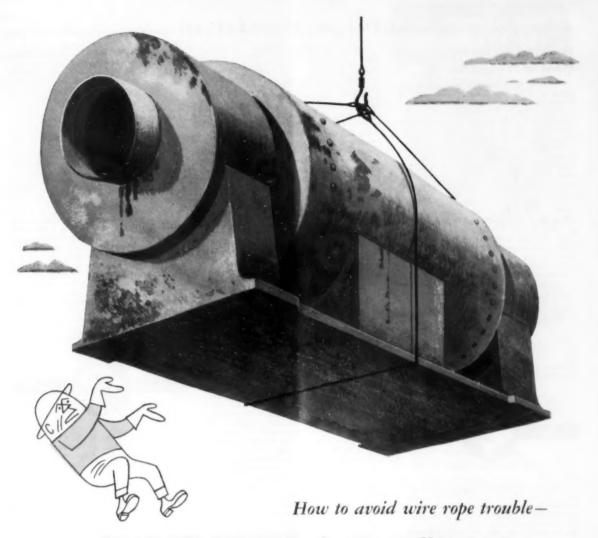
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New Florida Ilmenite Plant in Production

The new \$3,000,000 ilmenite mine and plant of E. I. du Pont de Nemours & Company has gone into production at Lawtey, Florida, Known as the Highland plant, and operated by the Humphreys Gold Corporation, it is similar to the Trail

Ridge plant near Starke.

While both plants have a designed capacity of 96,000 tons per year, the new Highland plant is expected to produce only 72,000 tons a year because it will operate on a shorter work week for the

Both plants are essentially the same, but the newer plant has some improve-ments gained from five years of operation at Trail Ridge. For example, the High-land wet mill is all one unit, combining 960 rougher spirals, 320 cleaners, and 160 finishers. At Trail Ridge the wet mill

160 hinshers. At Trail Ridge the wet mill spirals are separated into three banks.

Mining is done by a dredge floating on a "traveling lake," about a half mile long and 500 feet wide, dug out of the sandy soil. The sand is pulled up by a suction dredge and piped directly to a floating "scrubber" barge. There the organic coating is removed and the heavy black supports separated from the white coating is removed. mineral separated from the white sands by a system of spirals in the wet mill. This system was originally devised by Humphreys as an improved method of concentrating gold sands.



The federal government has called for The federal government has called for bids to sell metallurgical fluorspar for stockpiling purposes. The bidding was opened to the public on May 3 for either 60 or 70 percent grade of fluorspar. Under terms of the bid, the domestic producer is requested to make delivery by August 31, 1955. Bid prices will have to be on a competitive basis.

Permission to look for uranium in the open-pit lignite mines of the Truax-Traer Company in North Dakota has been obtained by Uranium Exploration, Inc. of Work is planned at the Velva, Custa, Kincaid, and Dakota Star mines. The firm also plans to explore leased land in the Denbigh sand hills where 21,000 acres are under lease.

Plans have been announced by American Alloys Corporation for the doubling of capacity of the Kansas City, Missouri smelter. Current production is now about 12,000,000 pounds of aluminum alloy ingot annually.

Russell Patillo of Caulfield, Missouri, who has been operating the Bakersfield iron mine for the past two years from which he reportedly has shipped 300 carloads of ore, is now opening up a new mine 10 miles southeast of West Plains.

Uranium has been reported on the John Geary Ranch near Bullion Butte close to Beach, North Dakota. Samples taken from four sections of the land varied in content from 0.10 to 0.50 percent U2Os.

Small individual operations of iron ore mining near West Plains, Missouri, hither-

to considered unimportant because of the low quality of the "brown" ore, may change in status, as a result of a new low-cost blast furnace. Preliminary findings as a result of a study of the furnace by the metallurgy department of the Missouri School of Mines, indicates it might have an important place in making the mining of this low-grade ore eco-nomically sound. At present there is little market and what small amounts now being mined are shipped as far south as Birmingham, Alabama with the result that the freight eats up the profits. Brown ore has been mined in this area since 1888 and is found in the surface clay. Some of the small operators now use power shovels, running the product through rotating log washers but the total production is low.



The Office of Defense Mobilization has revealed that the government now has on hand metals and minerals valued at \$800,000,000 of the long-term stockpiling goal of \$3,100,000,000 established by the Presidential Directive of March 26, 1954. At present 76 materials are being stockpiled. Of these, 39 were completed by December 31, 1954, and nine others were 75 percent completed. By June 3, 1956, the government expects that 62 minimum objectives will be 75 percent or more completed. Effective April 28, the Bureau of For-

eign Commerce, Department of Com-merce, added lithium alloys, ores and concentrates, and lithium-containing min-erals, to the list of items requiring validated export licenses The controls over these commodities are tightened to protect the national security. Exporters are now required to submit individual applications to export any of these lithium commodities to any destination ex-

cept Canada.

The U.S. Mica Purchasing Depot in Spruce Pine, North Carolina paid miners almost \$228,000 for 16,979 pounds of strategic grades of sheet mica for the national stockpile during the month of March. This was at the rate of \$2,736,000 a year, and amounted to almost \$1,000 a year, and amounted to almost \$1,000 a day despite bad weather during the month. The March purchases were broken down as follows: ruby mica—10,043.73 pounds, \$117.565.38; non-ruby mica—6,935.59 pounds, \$108,404.04. The lower price per pound for ruby mica, as compared with the price for non-ruby, was attributed mainly to much smaller view of ruby hearing of the characters. sizes of ruby being offered.

The Atomic Energy Commission has The Atomic Energy Commission has approved a proposal by the Seminole Electric Cooperative, Inc. of Madison. Florida, to study the feasibility of small central station nuclear power plants. The study will be under the AEC's Industrial Participation Program. Seminole is a federation of five electric distribution cooperatives in northcentral Florida, fi-nanced by Rural Electrification Administration loans.

American Machine and Foundry Company of New York has been awarded a contract for the design, engineering, and construction of a nuclear reactor by Battelle Memorial Institute, Columbus, Ohio. One of the first to be owned and operated by a private organization, the reactor will be a key component in a \$1,500,-000 atomic research center Battelle is building in Columbus. The reactor will be designed to be of broad use in the study of industrial problems. Its primary function will be to provide an intense source of neutrons and atomic radiation for research uses. In this respect, it will supplement a large cobalt-60 gamma radiation source now being installed by Battelle, and reactor development and hot-cell laboratories planned by the Institute, in providing private industry with complete facilities for studies in the field of atomic energy.

Preliminary results of a reconnaissance survey by the United States Geological Survey in the vicinity of Rochester, New Hampshire have been placed in open file. The airborne magnetometer survey investigated a pyrrhotite body penetrated in water wells north of that city. It showed a definite magnetic pattern in the area which it is believed can be correlated with the geology. Anomalies may represent local changes in lithology or may be associated directly or indirectly with concentrations of magnetic minerals. Further investigation is required.



The merger of the E. W. Coons Company and the Pittsburgh Pacific Company has been announced. The company will carry on business under the name E. W. Coons Company with offices at Grant Street and First Avenue in Hibbing, Minnesota, the same offices as those now occupied by the Coons Company. Officers are W. C. Cohoe, president; W. E. Wilson, executive vice president; Hugh Harrison, mining vice president; A. I. Foster, treasurer; E. T. Binger, assistant treasurer. Hugh Harrison and E. T. Binger will continue as president and secretary of the *Pacific Isle Mining Company*.

An unusual situation arose during the week of April 25th when the usual pro-cedure was reversed and a boatload of iron ore was brought from lower lake ports to the head of the Great Lakes. The ore was unloaded in Duluth and transferred to railroad cars to be hauled transferred to railroad cars to be hadied to Oliver Iron Mining Division's Extaca Plant. This ore came from the U. S. Steel Corporation's company operations in Venezuela and was shipped to Extaca for test work to determine how it would work in this sintering and nodulizing plant

Cleveland-Cliffs Iron Company mines have returned to a five-day, two-shift week after a year and 18 days of short-ened four-day work weeks. Only the Humboldt mine will not be affected, and this is because this operation has been on a seven-day week for some time. Improving conditions in the steel industry brought about the change.

The first iron ore has been hoisted through the M. A. Hanna Company's new Cannon mine shaft at Stambaugh, Michigan, after 43 months of shaft sinking and development work. The ore is coming from the new seventh level at a depth of 1,000 feet below the surface. Two 250-cubic-foot turnover type skips raise the ore and dump it onto an apron feeder. It is then fed to a 30-inch belt conveyor which delivers the ore to an air-gate type hopper. Ore from the hopair-gate type nopper. Ore from the nop-per is loaded into eight-ton dumptors which truck it to stockpile. During the regular shipping season, however, ore will drop from the hopper directly into railroad loading bins, and then into ore cars for shipment to the docks at Escanaba, Michigan.

The following new beneficiation plants have started operation this season on the Mesaba and Cuyuna Ranges: Jones and Laughlin Steel Corporation's HMS & jig plant at the Wentworth mine; Pickands Mather & Co. HMS and cyclone plants at the Bennett, Danube, Tioga, and Mahnomen mines; and M. A. Hanna

Mannomen mines; and M. A. Hanna Company's Humphreys spiral plant to re-treat fines from the Harrison mine. Port Dolomite, Michigan, the newest raw material port on the Great Lakes, has officially been opened with the loading of the first shipment of high-grade dolomite limestone from the U. S. Steel Corporation Michigan Limestone Diction's new quarry. The port was constructed by the Division to become the shipping point for the Cedarville dolomite limestone quarry which has just started full-scale production. The quarry has just has an annual rated capacity of 3,000,000 tons. A primary crusher is located on the floor of the quarry; stone is hauled from the crusher to the port over a new railroad built over a swamp and rugged ter-Port facilities include secondary and tertiary crushers and a screening plant

The new 1.353-foot "C" shaft being sunk at the Cliffs shaft mine of Cleve-land-Cliffs Iron Company will be equipped with three Koepe hoists for the skips and cage. The three hoists and some accessory equipment will be lo-cated in a structural steel enclosure on top of the concrete headframe. Hoisting speed will be 1,000 feet per minute and for greater depths can be increased to 2,000 feet per minute. (The advantages of Koepe hoists were discussed in Min-ING WORLD'S February 1955 issue, pages 49-51, 68.) Primary and secondary crushing will be done underground in a station near the shaft below the 15th

Employment costs for 750 employees of Republic Steel Corporation's Michigan and Minnesota ore mines were \$3,817,000 in 1954. Included in these costs are wages and salaries and the costs to Republic for pensions, social security, and life, sickness and accident, hospitalization and surgical operation insurance. Republic owns and operates mines at Crystal Falls, Michigan, and at Keewatin and Stevenson, Minnesota. Included in the above figures are payments made to about 175 employees the Susquehanna Ore Company at Hibbing, operated by Republic, and payments made during the first nine months of the year to employees of Penokee mine at Ironwood which was sold by Republic in October 1954. Wage and salary alone amounted to \$3,474,000, compared to the record high of \$4,413,000 paid in 1953.

The Minnesota Iron Range Resources and Rehabilitation Commission was di-rected by Governor Orville Freeman to expend \$300,000 for iron ore test drilling at Eveleth, Minnesota. Test drilling is necessary to determine if there are additional ore reserves in the area. Valuations of the state tax department would be checked under the project.

The Ores Research Center of the Michigan College of Mining and Technology at Houghton, Michigan is ex-pected to be completed late this fall The Center will help to develop new processes for using Michigan's millions of tons of low-grade metallic and non-metallic ore reserves. It will be the first publicly supported research center in Michigan devoted to research on grade ore. Although geared primarily to research on copper and iron ores, the center will also be prepared to assist in developing such other minerals as quartz, gravel, feldspar, and granite.

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